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ECOSYSTEM CLASSIFICATION HANDBOOK

CHAPTER 4 - ECODATA SAMPLING METHODS

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4.1 - GENERAL INFORMATION

4.11 - Objectives

The primary objective of the ECODATA Sampling Methods is to provide a standardized system for description of basic ecosystem information at a sample plot of fixed or unspecified size. Such information, when combined with timber stand exam and soil survey interpretations, will meet data requirements for resource management. A secondary objective is to promote integrated use of vegetation data by all resource functions.

4.12 - Major Features

1. ECODATA Sampling Methods are designed for multi-resource inventory and monitoring applications. They may be used in conjunction with other data collection procedures, such as stand exam, wildlife habitat analysis, range inventory or soil survey to facilitate integrated sampling of land-based resources.

2. ECODATA Sampling Methods provide a multi-level intensity approach to vegetation sampling. Sampling intensities range from simple reconnaissance methods, where only minimal information is collected, to intensive sampling methods which describe within plot or between plot variability.

3. ECODATA Sampling Methods provide specific geographic locations of plots and descriptions of vegetation types within map polygons. Such location identifications insure that data can be synthesized from different inventory or monitoring efforts over varying timespans. Such data can then be used for correlation with photographic interpretation (PI) types or spectral data, such as LANDSAT.

4. ECODATA Sampling Methods provide standardized sampling techniques and descriptions of site attributes to facilitate synthesis of data from different inventory or monitoring efforts over varying timespans. Data collected from non-National Forest System sampling efforts can be used to provide a data base that makes use of all sampling efforts within a geographic area by these methods.

5. ECODATA Sampling Methods provide for description of vegetation types within a stand. They are designed for use in describing or modeling various information layers in a geographic information system.

6. ECODATA are managed at the Forest and District levels, but can be grouped at larger geographic levels for analysis.

7. ECODATA provides for standardized coding of habitat type (Appendix A) and plant species names (Appendix K) within a regional data base.

4.13 - Major Terms

The following terms are important to the description of ECODATA Sampling Methods. The definitions provided follow those in the ecology literature (see Appendix F), but tend to be more specifically defined. Such modifications have been made to insure consistent field sampling which meets USDA, Forest Service, Northern Region, ecology needs.

Mapping Terms

Complex - where two or more dissimilar vegetation stratum are in the same stand (polygon) and each makes up greater than 20 percent of the stand area.

Dissimilar Vegetation Stratum - a vegetation classification grouping with properties which cause it to react differently than associated groupings with reference to classification objectives.

Geographic Description Area (GDA)--synonymous to mapping window and mapping/sampling area - an area delineated on a map or aerial photo that is large enough to contain most of the common vegetation and site conditions for the total area that is being mapped and described. The GDA typically ranges from about 1 square mile up to 4 square miles in size and may be extrapolated to represent an area that ranges from 4 to 100 times its size.

Inclusion - where a dissimilar vegetation stratum comprises less than 10 percent of the stand or polygon area.

Mapping Unit - all of the stands or polygons with similar strata or complexes of strata. The mapping unit is described relative to the percentage of each strata that typically occurs within a stand or polygon of that mapping unit.

Polygon - a contiguous unit of land which is delineated on a map or aerial photo within a closed boundary. Due to the scale of mapping, a ploygon may contain either similar or dissimilar strata. A forested polygon is one that has at least 10 percent tree canopy cover. A non-forested polygon supports less than 10 percent cover of tree species.

Stand - a type of polygon which is designed to describe one dominant stratum type within a uniform environmental setting.

Stratum - a vegetation classification category. Stratum may be defined at any level of resolution dependent upon classification needs. A vegetation type stratum contains all the land within a defined vegetation type. A timber stratum contains all the land within a particular cover type, crown closure, and/or size class. A community type stratum contains all the land within one particular seral or climax community type.

Vegetation and Site Potential Terms

Climax Plant Community - the culminating stage in plant succession for a given environment that develops and perpetuates itself in the absence of disturbance. Such communities form the reference vegetation expression of a habitat type.

Community Type - all the plant communities in which the dominant and/or indicator species of corresponding layers are similar.

Cover Type - all of the stands in which one or a group of dominant species are similar. A forest cover type is one that supports 10 percent or more tree species cover. A non-forest cover type is one that supports less than 10 percent tree cover.

Dominant Species - those species in a stand that, in comparison to other species, have the greatest foliar canopy volume per acre. Foliar canopy volume per acre is the product of canopy cover expressed as a decimal (percent canopy cover/100) and 43,560 square feet per acre and height in feet. For example, in a ponderosa pine/bluebunch wheatgrass stand, ponderosa pine may only have 10 percent canopy cover, while bluebunch wheatgrass may have 60 percent canopy cover. If the ponderosa pine is 120 feet tall and the bluebunch wheatgrass is 2 feet tall, the ponderosa pine is considered the dominant species, since its foliar canopy volume is 522,720 cubic feet (i.e., 10 percent/100 x 43560 x 120). In comparison, the bluebunch wheatgrass foliar canopy volume is only 52,272 cubic feet (i.e., 60 percent/100 x 4350 x 2). The ponderosa pine represents 10 times the foliar canopy volume of bluebunch wheatgrass. A more rapid numeric comparison can be made by multiplying canopy cover times height for an index. In the previous example, the index value for ponderosa pine would be (10 percent x 120 feet) 1200 and the index value for bluebunch wheatgrass would be (60 percent x 2) 120. Using this method, the index value for ponderosa pine is also 10 times the value for bluebunch wheatgrass.

Ecological Type - a land classification category which is more specific than a phase of a habitat type. Ecological types are commonly used to differentiate habitat phases into categories of land which differ in their ability to produce vegetation or their response to management.

Ecosystem Type - all the land that has potential to support a similar structural life form and has similar broad environmental characteristics. Examples include the nonvegetated ecosystem, conifer dominated ecosystem, juniper ecosystem, shrub dominated wetland ecosystem and the grassland/grass-steppe/mountain grass ecosystem.

Habitat Type - all the land capable of producing similar plant communities at climax. A habitat type name incorporates those indicator plant species which best define the environment to be classified. Typically two indicator plant species comprise a habitat type name. Habitat type identification at a site has to be estimated sometimes, since most managed sites support seral plant communities due to ongoing disturbance.

Habitat Type Phase - a refinement of a habitat type in which additional indicator plant species are used to define a more narrow range of environment condition.

Indicator Plant Species - Plant species that represent certain environmental (site or disturbance) conditions. An indicator plant species need not be a dominant member within a community type.

Layer - a sequence of vegetation defined relative to height and structural characteristics. A pole or mature tree layer is synonymous with tree overstory. A sapling and seedling layer under a tree overstory is synonymous with tree understory. Other layers typically include the shrub layer and herbaceous layer. A shrub or herbaceous layer under a tree overstory is synonymous with shrub or herbaceous understory. In a shrub dominated community without trees, the shrub layer is synonymous with shrub overstory and the herbaceous layer under the shrub overstory is synonymous with herbaceous understory.

Potential Natural Community - a biotic community that would develop if all succsessional sequences were completed under present site conditions without human interference. Natural disturbances are inherent in the development of potential natural communities. Naturalized non-native species, which may be favored by human disturbance, can be components of a potential natural community. The potential natural community of a site commonly has to be estimated, since most managed sites support seral plant communities due to ongoing disturbance. The potential community that will develop on a site can be recognized by identification of indicator plant species and site characteristics.

Seral Community Type - a community type that is not in equilibrium with its physical environment and is undergoing change in species composition, canopy closure, and size due to previous or ongoing

disturbance. Some seral community types may be maintained in a stable state due to a consistent annual disturbance or the dominance and competitive ability of certain seral plant species.

Site Type - all of the sites that have similar soil, parent material, slope position and shape, aspect, elevation, and climate. A site type will support one type of climax or potential natural community, and can be identified without reference to the existing vegetation on a site.

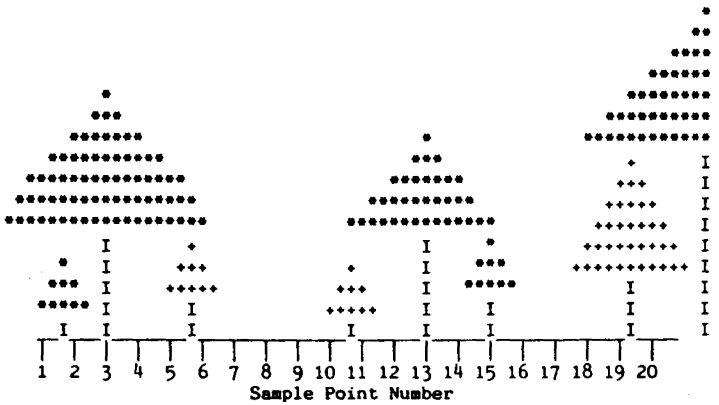
Vegetation Type - all the plant communities that are similar with respect to both species type and abundance within all layers. The vegetation type is characterized by minimal variability in plant species composition. For example, there may be several vegetation types in a habitat type.

Sampling Terms

Canopy Cover - the percent of horizontal area covered by the vertical downward projection of a plant's live foliage area. The live foliage area recorded should represent the maximum phenological development stage for the plant species. This requirement will necessitate estimation of an appropriate live foliage area for some species if sampling is conducted too early or too late in the season to adequately represent their maximum pheneological development.

Unless the canopy cover estimate is stratified by size or age class grouping, overlap within a species is not counted. A plant does not have to be rooted in the plot to be counted for canopy cover. All live foliage that provides cover of the plot is counted. Foliage from a plant that is rooted in the plot, but does not cover the plot, is not counted.

The following discussion outlines the procedure to be followed in determining canopy cover for a plant species. For each individual of a plant species, a horizontal polygon is circumscribed around the periphery of the foliage and mentally projected to a horizontal surface. The area enclosed by the polygon, expressed as a percent of the total sampling area, represents the canopy cover for that individual. The sum area of these polygons are divided by the total area of the sample and multiplied by 100 to calculate percent canopy cover by plant species. Different species may overlap and, therefore, it is common for the canopy cover sum for all species to be greater than 100 percent within either a microplot or macroplot. Figure 1 shows a vertical view example of a point cover sampling estimate for canopy cover of two species within a plot.



Total Number of Points = 20
Species A = * ; Canopy Cover Estimate = (14 / 20) x 100 = 70%
Species B = + ; Canopy Cover Estimate = (7 / 20) x 100 = 35%

Figure 1. Vertical projection example of a point canopy cover estimate of species A and B.

Absolute Cover is the percentage of the ground surface covered by a plant species as described in the previous canopy cover discussion. **Absolute cover is always recorded when describing plant species, age/size class, or life form canopy cover values in ECODATA.**

Relative Cover is the percentage of the total foliage cover a species contributes. The summed value for relative cover, considered over all species on a site, cannot exceed 100 percent.

Life Form Cover is the canopy cover for all plants within a life form; e.g., trees, shrubs, grasses, or forbs. It is the horizontal cover of the vertical projection of the collective plants within a life form, and does not include overlap. Consequently, if species within a life form overlap, the life form cover will be less than the sum of the species within a life form.

Constancy - the number of macroplots in which a species occurs at a specified level of cover or frequency divided by the total number of macroplots in the class or type being described. This value can be expressed as a percentage or a decimal.

Frequency - the number of microplots in which a species occurs divided by the total number of microplots in the macroplot being sampled. This value can be expressed as a percentage or a decimal.

Nested Rooted Frequency - the summed value of microplot subplot numbers in which a plant species is rooted. This value is usually expressed as a whole number. It may also be expressed on a relative percentage basis by dividing the observed nested rooted frequency of a species by the total nested rooted frequency recorded over all species sampled, and multiplying the product by 100. Nested rooted frequency is used to determine significant changes in plant species composition of a site over time. It is relatively insensitive to climatic variability effects on species performance at a site.

Macroplot - a relatively large plot of specified size and shape used to describe vegetation and site attributes. A macroplot may be located subjectively, without preconceived bias, to describe a stand or vegetation type. A number of macroplots may be randomly located within a stand or vegetation type to give a statistical description of within stand variability. Macroplots are typically 0.1-acre (4356 square feet) in size. Ocular macroplots are usually circular in shape, while macroplots with microplots are typically rectangular in shape.

Microplot - a relatively small plot located within a macroplot. Microplots have a specific size and shape (i.e., rectangular or circular), within which specific vegetation and site parameters are estimated or counted. A fairly large number of microplots must be sampled to describe a macroplot. ECODATA microplots are typically rectangular in shape and are 20 by 20 inches or 10 by 20 inches in size.

Point Cover - a sampling approach which utilizes fixed points to estimate canopy or ground cover. In this method a specific item at a point location is recorded. The number of points recorded for a given item; e.g., bare soil, rock, etc., divided by the total number of points, yields its cover on the plot. This value is expressed as a decimal or a percentage. Figure 2 shows an example of a point sample estimate for ground cover.

4.2 - DESCRIPTION OF ECODATA SAMPLING METHODS

4.21 - General Features of Basic and Optional Sampling Methods

There are five intensity levels of Basic Sampling Methods in ECODATA. These methods, in order of increasing intensity, are the Recon, Fastplot, Ocular Macroplot, Cover Microplot and Nested Microplot Methods. The level of sampling method employed for a particular project will depend upon study objectives. General environmental data and plant species data are collected in all basic sampling methods; however, the specific types of attributes recorded differ by method.

Optional Sampling Methods are provided to supplement data obtained from the Basic Sampling Methods. These presently include the Line Intercept Canopy Cover, Density, Production, Short Nested Microplot, Point Cover, and Optional Plant Species Attribute Methods. Additional Optional Sampling Methods are developed as needs arise.

4.22 - Criteria for Selection of Appropriate Sampling Method

To determine the type of sampling method to employ in a given study, an evaluation should be made which considers the following items:

1. Data Application - What will the data be used for in the short and long term?

2. Accuracy and Precision - What is needed to meet project analysis, area level analysis, Forest Plan analysis, and alternative uses?

3. Inventory and Monitoring Systems - Is timber stand delineation and exam being conducted in the area? Are other inventory and monitoring efforts ongoing? Could the efforts be organized to provide for more efficient use of people and travel time?

4. Cost - What is the most cost-effective sampling method given manpower, equipment, sampling time, and other factors?

5. Experience of Personnel - What types of methods can the personnel conducting sampling be expected to perform correctly given their past training?

The following key is used to determine the appropriate sampling method to employ for a given study.

A. The purpose of sampling is inventory. Go to --- B.
AA. The purpose of sampling is not inventory. Go to --- E.

B. Personnel doing sampling need calibration for ocular estimates. Conduct one macroplot for each ecosystem type to be sampled using the **Cover Microplot Method**. Then go to C. If not, go to BB.
BB. Personnel are calibrated for making ocular estimates. Go to --- C.

C. If data are to meet one or more of the following needs, use the **Ocular Macroplot Method**. If not, go to CC.
   1. Provide complete descriptions that can be used for all resource interpretations.
   2. Provide data that can be scored for ecological status (i.e., similarity to the potential community type).
   3. Provide data to describe unclassified potential or seral community types.
   4. Provide data to predict vegetation response to management treatments.

CC. For inventory where a more general description with a partial species list is adequate. Go to --- D.

D. An inventory technique is needed to sample macroplots; use the **Fastplot Method**. This sampling system is biased towards dominant species (see Section 4.23b). If not, go to DD.
DD. An inventory technique is needed that is a walk-through description of a stand or polygon. Use the **Recon Method**. This sampling system is biased towards dominant species (see Section 4.23a).

E. Monitoring of specific conditions or treatments is needed and permanently located plots are not appropriate. Go To --- F.
EE. Monitoring of specific conditions or treatments is needed and permanently located plots are appropriate. Go To --- G.

F. A statistically valid comparison of conditions or treatments is desired. Use the **Cover Microplot Method**. If not, go to FF.
FF. A statistically valid comparison of conditions or treatments is not necessary. A relative comparison of change in species canopy cover, height and general attributes is adequate. Use the **Ocular Macroplot Method**.

G. The purpose of the permanent plot is to provide statistically valid comparisons of conditions or treatments. Go to --- H. If not, go to GG.

GG. The purpose of the permanent plot is to provide a record of relative changes in species canopy cover, height, and general attributes. Use the **Ocular Macroplot Method.**

H. Statistical comparisons of species response over time on the permanent macroplot do not need to consider changes in nested rooted frequency of plant species. Use the **Cover Microplot Method.** If not, go to HH.

HH. Statistical comparisons of species response over time on the permanent macroplot need to consider changes in nested rooted frequency of plant species. Use the **Nested Microplot Method.**

4.23 - Key Features of the Basic Sampling Methods

4.23a - Recon Method

The Recon Method is designed to provide reconnaissance ecosystem information for the vegetation and environmental features within a stand or map polygon. It is not designed for macroplot characterization. Therefore, the data collected should not be combined with macroplot data in subsequent analyses.

A general summary of the total stand is provided by this method. General environmental and vegetation data are collected with cover estimates made for the dominant eight species of the polygon described, and an additional four species of significance recorded if needed. This method requires about 10 to 20 minutes per polygon to complete depending on access, polygon size, ability of personnel to identify plant species, and community complexity.

The Recon Method may be used in areas that require new mapping or where mapping for some other purpose has been completed but a description of the vegetation is desired. The kind, amount and location of vegetation types that occur within a project area are described. If there is a complex or inclusion of different vegetation types within a stand, each type may be described by this method. Data obtained may be used for general descriptions, correlations and habitat type mapping.

The Recon Method is biased in that dominant species are selectively sampled and described. Hence, the average cover for a species from a group of stands is not a true average cover. The average cover value obtained is for stands where that species is dominant and does not include the stands where it occurs in lesser amounts relative to other dominant species. The constancy for a species is also not a true constancy. Constancy, in this method, is

determined from stands where the species is dominant and does not include the stands where it occurs in lesser amounts relative to other dominant species.

4.23b - Fastplot Method

The Fastplot Method is designed to provide ecosystem information for a macroplot in a short period of time. It can be used when the intended sampling purpose does not require a total species list but instead requires a description of dominant species, vegetation type, and general terrain relationships. Data obtained by this method should not be used for developing new classifications of habitat types, community types, or determining ecological status. More intensive level plot data may be reduced and combined with fastplots, but fastplots cannot be grouped with more intensive level data.

General environmental and vegetation data are collected. Cover estimates are made for the dominant eight species of the plot being described, with an additional four species of significance recorded if needed. This method requires about 10 to 20 minutes per plot to complete depending on access, ability of personnel to identify plant species, and community complexity.

This method is biased in that dominant species are selectively sampled and described. Hence, the average cover for a species from a group of plots is not a true average cover. The average cover value obtained is for plots where that species is dominant and does not include the plots where it occurs in lesser amounts relative to other dominant species. The constancy for a species is also not a true constancy. Constancy, in this method, is determined from plots where the species is dominant and does not include the plots where it occurs in lesser amounts relative to other dominant species.

4.23c - Ocular Method

The Ocular Method is designed to provide an indepth description of the vegetation and environmental features at a plot. It should be used when both dominant and indicator species are required to describe the ecosystem. General environmental characteristics, stand structure, history and a total species list are recorded. Such data may be used for classification of habitat types, developing habitat type prediction models, community type description, predicting vegetation response to treatment, evaluating resource value, determining ecological status, evaluating similarity to old growth and calculating similarity to the potential natural community. The method requires approximately

30 minutes to 1 hour per plot to complete depending on access, ability of personnel to identify plant species, and community complexity.

4.23d - Cover Microplot Method

The Cover Microplot Method is designed to provide quantitative vegetation data at a plot. It is used when a replicated sampling design and statistical analysis are required or there is a need to calibrate ocular estimates. In this method canopy cover by species, ground cover, and production by life form are estimated through replicated sampling of microplots wihin a macroplot. This method requires 2 to 3 hours per plot to complete depending on access, ability of personnel to identify plant species, and community complexity.

Data obtained by this method may be used for classification of habitat types, developing habitat type prediction models, community type description, predicting vegetation response to treatment, evaluating resource value, determining ecological status, evaluating similarity to old growth, calculating similarity to the potential community and monitoring change over time. This method is not suitable for issolating the effects of climatic variability from management practices when describing changes in vegetation populations or composition with time. The Nested Microplot Method (Section 4.23e) is used to assess changes in vegetation populations or composition over time when climatic variability is of concern.

4.23e - Nested Microplot Method

The Nested Microplot Method is designed for statistically describing changes in vegetation over time, through use of nested rooted frequency measurements of plants. The same types of data are collected in this method as in the Cover Microplot Method with the addition of nested rooted frequency by plant species. Once permanent plots and transects have been located and installed, about 4 to 6 hours are required for data collection at a plot depending on access, ability of personnel to identify plant species, and community complexity.

Data obtained by this method may be used for classification of habitat types, developing habitat type prediction models, community type description, predicting vegetation response to treatment, evaluating resource value, determining ecological status, evaluating similarity to old growth, calculating similarity to the potential community and monitoring change over time. This method is well suited for monitoring changes in vegetation over time as a function of management activities.

4.24 - Key Features of the Optional Sampling Methods

The following sampling methods may be used to supplement data obtained from the Basic Sampling Methods discussed in Section 4.23.

4.24a - Line Intercept Canopy Cover Method

This method is designed primarily for quantitative measurements of shrub canopy cover and may be used to calibrate ocular shrub cover estimates. It provides more quantitative determinations of canopy cover than ocular assessments, and is particularly useful in assessing shrub canopy cover changes over time. In this method, five to seven transect lines are randomly located along a macroplot baseline. Transect length is usually 66 feet, but may be changed depending on study needs. Inches of live canopy cover intercepted above and below the transect line are recorded by plant species. Canopy cover of a plant species is computed as follows: total live canopy cover intercepted (in.) / total line intercept length (in.) x 100 = percent cover.

4.24b - Density Method

This method is designed to provide density (i.e., number per unit area) estimates of plant species, gopher mounds, pellet counts, and other important variables. Additionally, plant species density may be recorded by age-size class or some other class grouping. Sampling is usually conducted within five to seven transects which are randomly located along a macroplot baseline. Sampling may also be conducted within five to seven circular plots dependent on study needs. Transect lengths are usually 66 feet but may be changed depending on study needs. Counts of specific items (plant species, etc.) are made perpendicular to each transect line within a specified transect width. For example, a 2.2-foot width along a 66-foot transect line is equivalent to a 1/300-acre plot. Density counts of an item collected within such a transect may be multiplied by 300 to obtain item number per acre.

4.24c - Production Method

This method is designed for making assessments of production by selected plant species, genus, or life form groupings within a macroplot. It is used when the microplot sizes for the Cover Microplot and Nested Microplot Methods are not suitable for making production estimates within a macroplot or when production data by plants species or genus are desired. Microplots of any shape may be used in this method so long as their dimensions can be expressed in units of square feet. This method allows for statistical analysis of production data on either a microplot or transect basis.

4.24d - Short Nested Microplot Method

This method is used to record the same data contained in the Nested Microplot Method; however, only a few select plant species are sampled (i.e., a maximum of 12 species). It is appropriate for monitoring permanent plots when the objective of sampling is to detect changes over time for only a few indicator plant species. The Ocular Macroplot Method should always be used in conjunction with this method to insure that a complete species list is collected for the macroplot sampled.

4.24e - Point Cover Method

This method is used to record point estimates of cover within a macroplot for plant species, ground cover, or other items of concern. The points sampled in cover assesments may be systematically located (e.g., at 1-foot intervals along a transect tape) or randomly located within the macroplot dependent on study objectives. The Point Cover Method is useful in calibrating ocular assessments of ground cover. It should be considered for initial use by field crews when either the Fastplot or Ocular Macroplot Methods constitute the basic sampling methods to be used in a given study. It may also be used to record Parker Three Step data from rangeland trend analysis sampling.

4.24f - Optional Plant Species Attribute Method

This method is used to record cover by age-size class, distribution, phenology, and utilization data for selected plant species. It may be used when a Basic Sampling Method other than the Ocular Macroplot Method is employed in sampling.

4.25 - Field Forms

ALL FIELD FORMS, PHOTOGRAPHS, MAPS, AND NOTES MUST BE PERMANENTLY FILED IN AN APPROPRIATE STAND, ALLOTMENT, OR PROJECT FOLDER.

Field forms are provided for recording plot data in Appendix C. General environmental plot data are entered on Forms 1 or 3, dependent on whether a polygon or a fixed-size plot is sampled. Plant species data for the Basic Sampling Methods are entered on Forms 1, 2, 4, 5, and 6. Optional Sampling Methods are recorded on Forms 7 through C. These methods are used to complement data from the Basic Sampling Methods. Each form has a fixed format that is standardized for automatic data processing. The following is a listing of forms to be used in recording data for the various sampling methods:

Form 1 (Recon Data) is used in the Recon Sampling Method.

Form 2 (Fastplot Data) is used in the Fastplot Sampling Method.

Form 3 (General Plot Data) is used in the Fastplot, Ocular, Cover Microplot and Nested Microplot Sampling Methods.

Form 4 (Ocular Plant Species Data) is used in the Ocular Sampling Method.

Form 5 (Cover Microplot Plant Species Data) is used in the Cover Microplot Sampling Method.

Form 6 (Nested Microplot Plant Species Data) is used in the Nested Microplot Sampling Method.

Form 7 (Line Intercept Canopy Cover Data) is used in the Line Intercept Canopy Cover Sampling Method to determine live foliar canopy cover by plant species. Cover measurements are primarily taken for mid and tall shrubs in this method; however, other life forms may be sampled.

Form 8 (Density Data) is used in the Density Sampling Method to record density counts of items with or without reference to age or size class. Sampling is conducted within either transects of standard width or circular plots. Items such as animal pellets, plant species stems or bunches, tree seedlings, etc., may be sampled.

Form 9 (Production Data) is used in the Production Sampling Method to record production by plant species or life form within replicated subplots of a macroplot.

Form A (Short Nested Microplot Plant Species Data) is used in the Short Nested Microplot Sampling Method. This method is a shortened species list version of the Nested Microplot Sampling Method.

Form B (Point Cover Data) is used in the Point Cover Sampling Method to record point estimates of canopy cover by plant species, ground cover, or other items.

Form C (Optional Plant Species Attribute Data) is used in the Optional Plant Species Attribute Sampling Method to record cover by age-size class, distribution, phenology, and utilization data for selected plant species.

4.26 - Filing of Field Data

Hard copies of ECODATA field forms, maps, notes, etc., should be permanently filed in an appropriate stand, map unit or project folder. Such information should be maintained in an organized manner at either the District or Supervisor's Office dependent on study needs. The designated Forest Ecological Coordinator should be notified as to the location of hard copy files related to all major ECODATA sampling efforts being conducted on a particular Forest.

4.27 - Permanent Plots

In each of the sampling methods, except the Recon Method, a plot may be located and marked on the ground for use as a permanent plot. The Fastplot and Ocular Methods are permanently located by placing a stake at the center point of the plot. Another stake should be placed outside the plot and a map made of both stake locations relative to permanent features. The Cover Microplot Method can be permanently marked in the same manner as the Nested Microplot Method (Section 4.36).

The location of permanent plots must be displayed on aerial photos and resource management maps, with copies filed in the project folder. A large scale drawing of the area and layout of the permanent plot must also be completed and filed in the project folder. **The location and number of permanent plots installed should be carefully considered.** Permanent plots should be installed only when other plot sampling methods will not meet monitoring objectives. The purpose of a permanent plot is to monitor change of vegetation and site variables over time. A common problem related to permanent plots is that too many are initially established and eventually sampling resources are not available to achieve remeasurement. Permanent plots typically take considerably longer to put in and, if not properly documented, can be very difficult or impossible to relocate. Locate permanent plots so they are effective in evaluating vegetation management systems, while also considering ease of relocation.

4.28 - Analysis of ECODATA

ECODATA entry, analysis methods, and programs are described in Chapter 5, Data Analysis. ECODATA is entered into the data base using DG/PROXI screens. The following FORTRAN programs are currently available to analyze ECODATA.

1. REPORT. This program prints out site attribute information codes. It also prints canopy cover, relative canopy cover, canopy volume and relative volume for plant species and summarizes descriptive information on plant species across life forms. For the Cover and Nested Microplot Methods, it prints the standard deviation, frequency, range and a confidence interval based on a user specified level of significance for each species.

2. SCORE. This program calculates the relative successional status of a plot. Plot data are scored by a model which has been developed from habitat type or ecological type classifications. The score reflects the similarity of the sampled vegetation to the potential vegetation for the site and, thus, indicates the ecological status. This program also uses data from plots selected by the user to develop a local model for an ecological type.

3. STRATA. This program describes community types using data from plots selected by the user. Average and standard deviation of site variables and plant species constancy and coverage are printed in a matrix format. Selected plots may be compared using a similarity evaluation procedure with plant species and site values printed for each plot. This community analysis program reformats data for analysis in SPSSX, a statistical package at the Fort Collins Computer Center (FCCC), and DECORANA and TWINSPAN multivariate analysis programs.

4. ERRCHK. This program checks for errors in the entered plot data. The program alerts the user of errors in the data base which must be corrected before running any of the programs described above.

4.3 - PROCEDURES FOR PLOT LOCATION AND LAYOUT

4.31 - Locating and Describing the Plot

4.31a - Plots of Unspecified Size (Polygons)

The Recon Method is designed for sampling plots of unspecified size (i.e., polygons). It is used to describe vegetation types within polygons; consequently, such plots vary in size and shape. The Recon Method may be used to describe previously delineated polygons, such as timber stands, range map units, or grizzly bear components. It may also be used to describe polygons in new mapping projects.

When delineating polygons on a map unit base, strive for minimum variation in the vegetation and environmental components. This will reduce the number of samples needed to describe the polygon at a set level of accuracy or precision. This reduction in variation is achieved by delineating fairly small polygons which contain minimum variability in cover type, photo texture and topographic features. For smaller scale map unit bases (e.g., 1:2400) this will result in less total sampling for the project area and, therefore, cheaper cost. However, in order to delineate polygons to the point where a polygon contains only one vegetation or site type, fairly large scale aerial photography is required, typically 1:12000. Mapping at this scale and with a more intensive legend will take more time than mapping at a smaller scale. The factors of scale, accuracy, precision and amount of variation to be accepted should be considered and standards set prior to the premapping and sampling effort.

4.31b - Plots of Specified Size (Fixed Size Plots)

For the Fixed Size Plot Methods (i.e., the Fastplot, Ocular Macroplot, Cover Microplot and Nested Microplot Methods), the plot is typically 1/10-acre in size and must be located within a representative and uniform portion of the vegetation and site conditions being described. This means that the plot should not cross ecotones of either vegetation or site conditions, and should be representative of the general treatment or management use practiced on the area to be described. However, in some cases the plot may be located to sample vegetation and site conditions within ecotones that are fairly broad. If the vegetation or site condition being described is too small for a 1/10-acre plot, then reduce the plot size and/or change the shape to fit within the vegetation or site unit. For mapping purposes, notation should be made as to whether the vegetation or site condition described is a representative area of a map unit, or if it is representative of an inclusion within the map unit.

For remote sensing correlation, if the plot is to represent an area or map unit, it should be located approximately within the center of at least a 3-acre area. If the plot is to represent an inclusion within the map unit, then locate it within a site that is representative of the inclusion. Inclusions may be of any size if they are determined to be important, provided they are reasonable vegetation or site units. The typical macroplot size is used in remote sensing correlation is 1/10-acre. If the site to be described is smaller than the 1/10-acre macroplot, reduce the size of the macroplot to fit within the vegetation or site unit.

4.31c - The Sampling Entity

The sampling entity is a relatively uniform plant community and its environment within a map unit or geographic area. The sampling entity should have one habitat type phase, similar vegetation structure and composition, occur on one of the nine aspects (Flat, N, NE, E, etc.), and have one slope shape. On the aerial photo the sampling entity should have a similar textural appearance, similar canopy closure and similar dominant plant species. The location of a macroplot or other sample area within the sample entity is done subjectively without preconceived bias (Mueller-Dombois and Ellenberg, 1974) to describe a representative area of the sample entity.

If ECODATA plots are described in conjunction with stand exam plots, the ECODATA plot center will coincide with the stand exam plot center. In this situation, the ECODATA plot may not be uniform, but since more samples are taken (typically, 10 plots per stand instead of one representative plot) stand variation will be described.

4.31d - Cataloging Plot Location and Number

Each examiner's plot or polygon numbers should be sequential through the field season for a given purpose of data collection. The combination of Forest number, Ranger District number, purpose for data collection, year, examiner number and plot or polygon number will make the data for each plot unique, even if combined with data from other inventories or monitoring efforts. This combination of data creates a 10-character alphanumeric Key-ID number which is recorded on all ECODATA field forms (Section 4.4).

Each plot or polygon location should be marked on an aerial photo or orthophoto quad sheet, and identified with the plot or polygon Key_ID number. It is very important for future use of plot data that locations be accurately identified on such references. Attempt to locate plots within ± 100 feet of their true location. If the location of the plot on the aerial photo is uncertain, determine a distance and bearing from an identifiable point on the

aerial photo. If a traverse is being made to describe a selected geographic area for correlation with aerial photo or remote sensing data, a log book should be kept. This log should have a starting point at an identifiable map location and the bearing and distance from each plot to the next plot denoted. The final plot should be referenced to an identifiable map location.

4.32 - Recon Method

The size of the area described by the Recon Method is variable, depending on the size of the mapped polygon (Section 4.31a). If complexes or inclusions of vegetation types exist within a polygon, they may be described, numbered, and the percent of area for each vegetation type within the polygon estimated.

4.32a - Considerations for Use With Existing Mapping Systems

In many cases, a map area may already be delineated into ploygons (e.g., timber stands, range allotments, big game winter range, grizzly bear habitat or classes from spectral data (LANDSAT)). The objective for using the Recon Method in such situations is to integrate mapping systems and describe polygons.

4.32b - Considerations for Use With New Mapping Systems

For areas without polygon delineations or where new delineations are desired based on ecosystem units, the following procedures are used: The project area to be mapped and sampled should be delineated on a map to display its boundaries. This area should be selected to meet objectives of the monitoring or inventory project. After the project area is located on a map, select the photogrametric materials which will be used as a mapping base for premapping. Such materials may include standard resource color photography, infrared or black and white photography, national high altitude photography (NHAP), or orthophoto maps. Construct overlays for the mapping base, tape their corners, and label such overlays with the appropriate orthophoto or aerial photo number.

To premap the project area, first delineate effective stereo coverage areas on alternate aerial photos. Next, using stereo photo pairs, map relatively uniform polygons. **Always use three-dimensional, stereo techniques to delineate polygons on aerial photographs.**

Use the following minimum criteria to delineate (premap) polygons on aerial photos:

1. Forest canopy closure classes for sapling and larger trees.

non-forest	-	< 10 percent canopy cover
open forest	-	10 - 39 percent canopy cover
forest	-	40 - 69 percent canopy cover
closed forest	-	70 percent + canopy cover

2. Photo texture, color and reflectivity. The parameters used should be indicative of differences in dominant plant species, tree density and structure, understory species, amount of bare soil and rock, amount and size of downed woody material, density and size of standing dead trees, and differences in structural stages.

3. Major changes in slope and aspect.

4. Slope shape, texture and position in the landscape. The parameters used should be indicative of differences in parent material, geomorphic process, soils, snow accumulation, wind effects, cold air drainage, frost pockets, and high water table.

5. Set a limit for the smallest size polygon to be delineated. This will depend on the scale of aerial photo or other map base used. For delineation or transfer to 1:24000 orthophotos, the polygons should be no smaller than 5 acres. Inclusions that are too small to be delineated, yet need to be located, are identified with a point or line and described as a polygon.

6. For correlation with spectral data, such as those derived from LANDSAT, select groups of pixels that have the same spectral class and delineate these as polygons on aerial photos or orthophoto quad maps. Use such map delineations to correlate vegetation descriptions with spectral value. Once uniform area delineations have been described, high variability delineations with complexes and inclusions can be identified and correlated.

4.32c - Sampling Existing or New Mapping Systems

A route is selected which is representative of the vegetation variability within the polygon. The vegetation types along this route are described using the Recon Method. For more intensive descriptions and/or correlation with specific points on the ground, the Ocular Macroplot or Fastplot Methods should be used in sampling.

4.33 - Fastplot Method

The typical Fastplot is a circular macroplot with a radius of 37 feet and an area of 4356 square feet (i.e., 1/10-acre). Measure and flag plot diagonals until you can generally judge the size of a plot. Distance may then be paced to quickly assess plot boundaries in future sampling efforts.

4.34 - Ocular Method

The typical Ocular plot is a circular macroplot with a radius of 37 feet and an area of 4356 square feet (i.e., 1/10-acre). Mark the center of the plot and then measure and flag the outside edge of the plot.

4.35 - Cover Microplot Method

4.35a - General Features

The typical macroplot sampled in the Cover Microplot Method is a 1/10-acre square measuring 66 x 66 feet. In some cases, due to a mosaic of vegetation types, this shape may be changed to insure uniformity in the sampled vegetation community. The typical baseline for the transects is 66 feet long and is located perpendicular to the slope (on the slope contour) with the 0-foot mark on the left and the 66-foot mark on the right as you face upslope. The baseline runs from west to east on flat areas with the 0-foot mark on the west end and the 66-foot mark on the east end. Transects are placed perpendicular to the baseline (i.e., parallel with the slope) and are sampled starting at the baseline. On flat areas, transects are located from the baseline to the north. **If a Cover Microplot Method plot is established as a permanent plot, use the plot layout procedures described for the Nested Microplot Method (Section 4.36).**

4.35b - Transect Layout

Locate transects within the macroplot perpendicular to the baseline and parallel with the slope. For permanent plots, determine compass bearing of transects and record these on the plot layout map. Five transects will be adequate for most sampling needs; however, up to seven transects may be sampled within a macroplot. **Consult Section 4.36f to determine the number of transects to sample.**

Starting locations of transects are determined by selecting a sampling scheme from a random number table or from Table 1. This table presents randomly generated sampling schemes for placement of five transects along a 66-foot baseline. Do not use the same sampling scheme for every macroplot. This will avoid transects always being placed in the same location along the baseline and creating a biased sampling system. Figure 3 provides an example of transect locations along a baseline using sampling scheme number 2. For seven transects, select a sampling scheme from Table 2. For example, if sample scheme 2 was selected for seven transects (Figure 3), two additional transects would be placed at the 15 and 35-foot marks.

Sample Scheme	Transect Number 1	2	3	4	5
	Distance Along Baseline (ft.)				
1	01	24	35	48	56
2	07	21	28	49	58
3	11	19	26	48	55
4	07	13	29	46	61
5	04	22	30	41	62
6	12	23	35	42	54

Table 1. Random number sampling schemes for five transects per macroplot.

Sample Scheme	Transect Number 1	2	3	4	5	6	7
	Distance Along Baseline (ft.)						
1	01	10*	24	35	48	56	64
2	07	15	21	28	35	49	58
3	11	19	26	36	48	55	61
4	07	13	29	37	46	57	61
5	04	14	22	30	41	47	62
6	03	12	17	23	35	42	54

* Underscored numbers are the additional transects

Table 2. Random number sampling schemes for seven transects per macroplot.

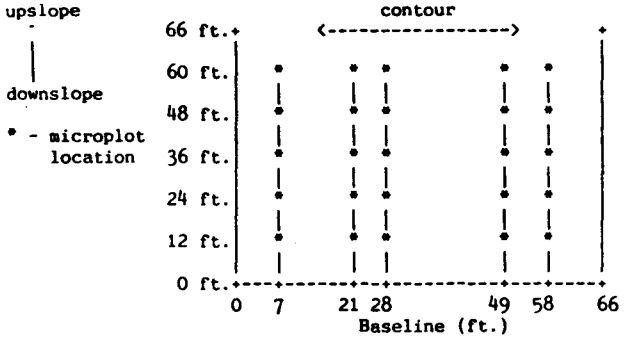


Figure 3. Example layout for a macroplot showing five randomly located transects using sample scheme two with five microplots per transect.

4.35c - Microplot Layout

Microplots are either 10 x 20 inches or 20 x 20 inches in size and contain various subplots to assist estimation of canopy cover. **Microplot construction and use are discussed in Appendix G.** For meadow or other vegetation types with dense vegetation (i.e., greater than 75 percent canopy cover of herbaceous plants over the macroplot and generally averaging more than two herbaceous stems in the smallest microplot subplots sampled), a 10 x 20-inch microplot is used. For less dense vegetation types, a 20 x 20-inch microplot is used.

There will usually be five microplots located at 12-foot intervals along a transect (i.e., at 12, 24, 36, 48, and 60 feet). For specific purposes which require higher statistical confidence, up to 10 microplots may be sampled. **Consult Section 4.36e to determine the number of microplots to sample.**

When sampling macroplots that are not scheduled for permanent remeasurement, the distance between microplots may be estimated by pacing after the examiner has practiced several layouts using a tape. **For permanent macroplots, you must measure the distance between microplots.** Each microplot will be placed to the right of the transect line facing upslope, or to the north on a flat. The lower left corner of the microplot frame will be placed at the foot mark for the microplot location. The left side of the microplot

frame is placed parallel to the transect. Figure 4 displays the proper placement of a microplot frame and the various subplots of a microplot.

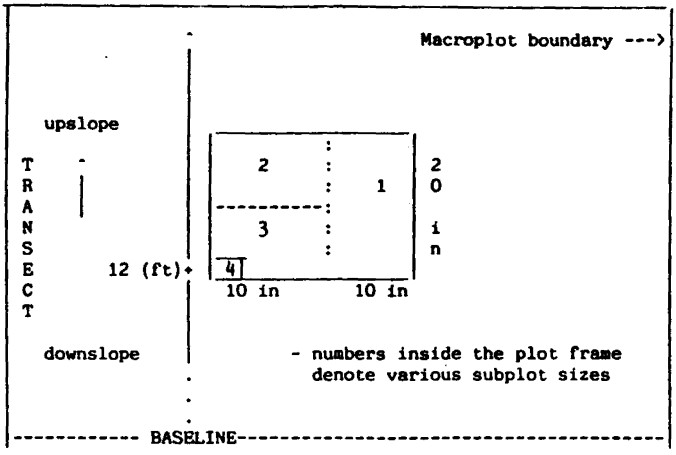


Figure 4. An example microplot placement along a transect.

To assist estimation of canopy cover within the two types of microplots discussed, a listing of subplot sizes and the percent of microplot area they represent are provided in Table 3. Subplots are used to estimate canopy cover for a plant species by mentally grouping all of the species cover within the microplot into one of the subplots. The percent size of that subplot, in relation to the size of the microplot being sampled, is used to make a cover class estimate for the species. Subplot 1 is the largest subplot and is only used with the 20 x 20-inch microplot. Subplot 4 is the smallest subplot. Subplots 2, 3 and 4 are used with both the 10 x 20-inch and the 20 x 20-inch microplots.

Subplot Number	Size of Subplot	% of 10 x 20 in. Microplot	% of 20 x 20 in. Microplot
4	2 in by 2 in	2 %	1 %
	5 in by 10 in	25 %	12.5%
3	10 in by 10 in	50 %	25 %
	15 in by 10 in	75 %	37.5%
2	20 in by 10 in	100 %	50 %
1	20 in by 20 in		100 %

Table 3. Percent of microplot represented by various subplots within two different sizes of microplots.

4.36 - Nested Microplot Method

4.36a - General Features

This method is designed for establishment of a permanent plot to monitor changes in vegetation and ground cover over time. Microplots are located in the same basic manner as in the Cover Microplot Method (Section 4.35); however, placement procedure is more exacting in this method.

Complete a detailed, large scale, permanent plot description map for each plot with notes concerning:

1. How to locate the general area of the plot;
2. How to locate the baseline;
3. A photo of the baseline which includes reference background features. Attach this photo to the map;
4. Compass bearing of the baseline and distance plus bearing of the 0-foot end of the baseline to a permanent landmark;
5. Bearing of transects from the baseline; and
6. Foot locations of transects on the baseline.

4.36b - Baseline Layout

Permanently mark the baseline with four steel markers. Record the foot location of each marker along the baseline in the plot location description. If a 66-foot baseline is used, such markers

are placed at 0 feet, 4 feet, 62 feet and 66 feet. In most sampling efforts, steel fence posts should be used at the starting and ending markers (e.g., 0 and 66 feet along a 66-foot baseline) with steel pins used for the two interior markers (e.g., 4 and 62 feet). Steel pins or reinforcing bar may be used for all four markers if the baseline can be easily located by reference to a permanent landscape feature. Use a file or other type of permanent marker to display 1, 2, 3, or 4 notches in the appropriate marker with 1 notch denoting the starting marker and four notches denoting the ending marker along the baseline.

From the starting and ending markers, take a compass bearing and distance to a permanent landmark (or several landmarks if available) and record such information on the general description map. Take a compass bearing from the starting marker to the ending marker and record this on the map and on the plot location description. Determine the compass bearing perpendicular to the baseline for each of the the transects and record them on the general description map.

4.36c - Transect Layout

Transects are usually 66 feet long and are located within the macroplot perpendicular to the baseline and parallel with the slope. The foot location of each transect along the baseline is determined through use of a random number table or one of the random location schemes provided in Tables 1 and 2 of Section 4.35. Such locations are permanently recorded on the general description map and in a written description of the plot layout. Transects are placed perpendicular to the baseline with a compass and tape to insure they are parallel to each other and can be relocated. Such precautions are required if photographs of the transects or microplots are to be compared over time.

4.36d - Microplot Layout

There will be five or 10 microplots located on each transect. For five microplots, the first microplot is located at the 12-foot mark on the transect. The remaining four microplots are located at 12-foot intervals at the 24, 36, 48 and 60-foot marks. For 10 microplots, the first microplot is located at the 6-foot mark on the transect. The remaining nine microplots are located at 6-foot intervals at the 12, 18, 24, 30, 36, 42, 48, 54 and 60-foot marks. Distance between microplots along a transect must be measured using a tape. The end opposite the baseline need not be permanently marked. Each microplot is placed to the right of the transect line facing upslope or to the north on a flat. The lower left corner of the plot frame will be placed at the foot mark for the plot location (see Figure 4).

Microplots are either 10 x 20 inches or 20 x 20 inches in size and contain various subplots to assist estimation of canopy cover (Table 3). Microplot construction and use are discussed in Appendix G. For meadow or other vegetation types with dense vegetation (i.e., greater than 75 percent canopy cover of herbaceous plants over the macroplot and generally averaging more than two herbaceous stems in the smallest microplot subplots sampled), a 10 x 20-inch microplot is used. For less dense vegetation types, a 20 x 20-inch microplot is used. The same microplot size must be used for all remeasurements of a plot.

4.36e - Determining the Number of Microplots to Sample

Five microplots are sampled along the first transect at placement intervals of 12, 24, 36, 48 and 60 feet. The cumulative number of new plant species, absolute number of new plant species (i.e., the number of new species in a particular microplot), and percent increase in new plant species for each microplot are calculated. Percent increase in new plant species is calculated by dividing the absolute number of new species in a given microplot by the cumulative number of new species encountered up to and including that microplot.

An example calculation of microplot sampling needs follows, which utilizes field data (Table 4) and a graphical display of such data (Figure 5).

Table 4. Example plant species data from 10 microplots sampled along the first transect on two different sites.

Microplot #	Cumulative # of New Species	Absolute # of New Species	% Increase in New Species
Crow Creek Site			
1	7	7	100
2	9	2	22
3	10	1	10
4	12	2	17
5	12	0	0
6	12	0	0
7	13	1	8
8	13	0	0
9	13	0	0
10	14	1	7

Table 4.--Continued

Microplot #	Cumulative # of New Species	Absolute # of New Species	% Increase in New Species
Mule Bench Site			
1	1	1	100
2	4	3	75
3	6	2	33
4	9	3	33
5	9	0	0
6	10	1	10
7	13	3	23
8	13	0	0
9	16	3	19
10	16	0	0

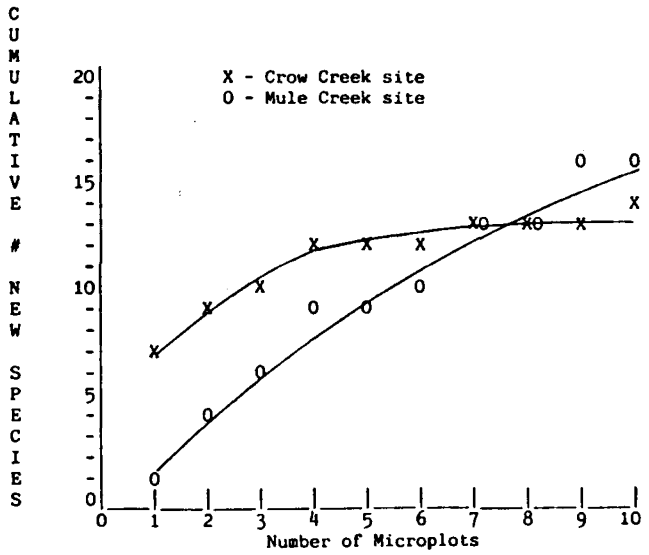


Figure 5. Graph of a species area curve for determining number of microplots to sample per transect.

If the percent increase in new plant species recorded through (and including) the fifth microplot is less than 25 for two consecutive microplots, only five microplots are required. If this condition is not met, 10 microplots are required. An alternative method of determining the number of microplots to sample is to construct a species-area curve from the data (Figure 5). If the slope of the species-area curve does not flatten out by the fifth microplot, then use 10 microplots per transect.

In the examples provided (Table 4 and Figure 5), the Crow Creek site has a floristic distribution sufficiently uniform to meet the criteria for five microplots per transect. In contrast, the Mule Creek site displays considerably more variation in floristic distribution, requiring that 10 microplots per transect be sampled.

4.36f - Determining the Number of Transects to Sample

Begin by laying out and recording plant species data within five transects. To determine if five transects are adequate, calculate the cumulative number of new plant species, absolute number of new plant species and the percent increase in new plant species for each transect using the same proceedure described in Section 4.36e. If the percent increase in new plant species recorded through the fifth transect is less than 25 for two consecutive transects, only five transects are required. If this condition is not met, seven transects are required.

An alternative method of determining the number of transects to sample is achieved through construction of a species-area curve from the data as shown in Figure 5. If the slope of the species-area curve does not flatten out by the fifth transect, then use seven transects per macroplot. **For remeasurement of a macroplot, you must take the same number of microplots, on the same number of transects, at the same locations. Always use the same microplot size when remeasuring a macroplot.**

Both the Crow Creek and Mule Bench sites have floristic distributions sufficiently uniform to meet the criteria for five transects per macroplot (Table 5). The resulting sampling system for the examples provided is five transects with five microplots per transect for Crow Creek and five transects with 10 microplots per transect for Mule Bench.

Transect #	Cumulative # of New Species	Cumulative # of New Species	% Increase in New Species
Crow Creek Site			
1	14	14	100
2	20	6	30
3	23	3	15
4	24	1	4
5	24	0	0
6	27	2	7
7	30	3	10
Mule Bench Site			
1	16	16	100
2	23	7	30
3	33	9	27
4	35	2	6
5	37	2	5
6	37	0	0
7	41	4	10

Table 5. Example plant species data from seven transects on two different sites.

4.4 - DATA COLLECTION PROCEDURES--ENVIRONMENTAL DATA FOR THE BASIC SAMPLING METHODS

4.41 - Overview

ALL FIELD FORMS, PHOTOGRAPHS, MAPS, AND NOTES MUST BE PERMANENTLY FILED IN AN APPROPRIATE STAND, ALLOTMENT, OR PROJECT FOLDER.

Environmental data are described on Forms 1 (Recon Data) and 3 (General Plot Data). The fields presented in section 4.42 are from the General Plot Data Form. Selected fields from section 4.42 are also used to characterize environmental data in the Recon Data Form, resulting in a more condensed environmental description in the Recon Data Form as contrasted to the General Plot Data Form. The types of data contained within a given field number are the same for both Forms 1 and 3. The symbol notation and size, however, of some Recon Data fields differ from their counterparts in the General Plot Data. This is due to the fact that a polygon is being described in the Recon Sampling Method instead of a fixed size plot. Notation is provided in section 4.42 to alert the user when a specific field may contain different coding values dependent on whether Recon Data or General Plot Data are being collected.

A shortened version of the General Plot Data Form may be used in combination with the Fastplot Plant Species Data Form (Form 2) when employing the Fastplot Sampling Method. An example of this form is provided in Appendix C. A condensed listing of field codes for all the ECODATA Sampling Methods is provided in Appendix I.

4.42 - Field Form Coding Instructions and Accuracy Standards for Environmental Data (Forms 1 and 3)

The following data are recorded for Form 1 (Recon Data) and Form 3 (General Plot Data). All of the fields provided are on Form 3; however, Form 1 has only the fields needed for the Recon Sampling Method.

ALL ALPHA CHARACTERS MUST BE ENTERED AS CAPITALS.

MISSING DATA OR FIELDS NOT EVALUATED ARE ENTERED AS BLANKS FOR ALPHANUMERIC FIELDS AND AS ZEROES FOR NUMERIC FIELDS.

ALPHANUMERIC FIELDS ARE ALWAYS LEFT JUSTIFIED AND NUMERIC FIELDS ARE ALWAYS RIGHT JUSTIFIED WHEN RECORDING DATA.

Field 1 - Key_ID (10-character alphanumeric code)

Record in order the codes used to index National Forest (2-digits), Ranger District (1-digit), Purpose (1-character), Year (2-digits), Examiner (1-character) and Plot Number (3-digits). This 10-character plot Key_ID is a data management code and must be unique; it is not a geographic locator.

Required on all Ecodata forms.

Accuracy Standards - No Errors

Use the following codes:

Fo - Forest (two-digit number)
D - Ranger District (one-digit number)

Record the National Forest (NF) and Ranger District (RD) where the plot or stand is located.

An example entry for the Beaverhead NF, Wise River RD, would be: 0 2 2 .

Forest and District Codes

02	Beaverhead	03	Bitterroot	04	Idaho Panhandle
1	Dillon	1	Stevensville	1	Wallace
2	Wise River	2	Darby	2	Avery
3	Wisdom	3	Sula	3	Fernan
6	Sheridan	4	West Fork	4	St. Maries
7	Madison			6	Sandpoint
				7	Bonners Ferry
				8	Priest Lake
				9	Red Ives
05	Clearwater	08	Custer	09	Deerlodge
1	Pierce	1	Sheyenne	1	Deerlodge
2	Palouse	2	Beartooth	2	Jefferson
3	Canyon	3	Sioux	3	Philipsburg
4	Kelly Creek	4	Ashland-Fort Howes	4	Butte
5	Lochsa	6	Grand River		
6	Powell	7	Medora		
		8	McKenzie		
10	Flathead	11	Gallatin	12	Helena
1	Swan Lake	1	Big Timber	1	Townsend
2	Condon	2	Livingston	3	Helena
4	Spotted Bear	3	Gardiner	4	Lincoln
* 6	Hungry Horse	6	Bozeman-Gallatin		
7	Glacier View	7	Hebgen Lake		
8	Tally Lake				

14	Kootenai	15	Lewis & Clark	16	Lolo
1	Rexford	1	Rocky Mountain	3	Missoula
2	Yaak	4	Judith	4	Ninemile
3	Fortine	6	Musselshell	5	Plains
4	Troy	7	Kings Hill	6	Seeley Lake
5	Libby			7	Superior
6	Fisher River			8	Thompson Falls
7	Cabinet				

17	Nez Perce	18	Glacier NP
1	Salmon River	1	North Park
3	Slate Creek	2	Middle Fork
4	Clearwater	3	Hudson Bay
5	Red River	4	Missouri
6	Moose Creek		
7	Selway		
8	Elk City		

30	Butte BLM District	40	State of Montana Lands
1	Hoodoo Resource Area	1	Swan State Forest
		2	Stillwater State Forest

51 Burlington Northern (Plum Creek) Lands
1 Inside National Forest Boundary
2 Outside National Forest Boundary

52 Champion International Lands

55 Other Private Lands
1 Inside National Forest Boundary
2 Outside National Forest Boundary

P - Purpose (one-character alphanumeric code)

Enter the code for the primary purpose of data collection:

If more than one code applies, such that no one purpose is primary, enter I for integrated inventory or monitoring.

S	Correlation with stand exam
P	Correlation with permanent timber management plot
T	Correlation with regeneration exam/stake rows
F	Evaluation of fire effects or fire history and fuels
C	Endangered plant species habitat analysis
G	Endangered animal species habitat analysis
W	General wildlife habitat
B	Big game habitat evaluation
R	Range allotment inventory
M	Range monitoring; e.g., readiness, trend, utilization

A	Analysis for recreational impacts--human or stock
V	Correlation with soil survey
D	Watershed erosion, effects, rehab or cover evaluation
K	Mining or oil/gas pad rehabilitation monitoring
Z	Research Plots
L	Correlation/verification for spectral data/landsat
J	RNA and special interset area analysis
E	New Ecosystem classification or succession analysis
I	Integrated multi-resource inventory/monitoring
H	Previous habitat type classification data
X	Other purpose not identified above

For additional codes, coordinate with the Regional Office.

YR - Year (two-digit number)

Enter the last two numbers for the calendar year. For 1986, enter: 8 6.

E - Examiner (one-character alphanumeric code)

Enter a number or letter for the examiner or crew, which is unique by District and purpose for the year of sampling. A record of the examiner's name and unique character should be kept in the project file. Avoid the use of the letter O and the number 0. There are 34 potential unique characters using the numbers 1-9 and all 26 letters. It is very important that Forest and District ECODATA coordinators assure that there are no duplicate 10-character plot numbers within a year of sampling. Two different samplers could use the same examiner code, but they must make sure they do not have identical plot numbers.

SPol# or Plt - Plot Number (three-digit number) or Sequential Polygon Number (three-digit number).

For Recon Data (Form 1), enter a right justified three-digit number for the polygon that is unique by examiner, purpose and year. Enter sequential numbers for each new polygon visited by the examiner through the calendar year, up to 999. If one examiner describes more than 999 polygons, a new examiner code should be assigned. This sequential polygon number will not be the same as the polygon (Field 27) and vegetation type (Field 28) number for a given mapping/sampling area.

For General Plot Data (Form 3), enter a right justified three-digit number for the plot that is unique by examiner, purpose and year. Enter sequential plot numbers for each examiner, within a purpose, through the calendar year, up to 999. If one examiner samples more than 999 plots for one purpose, a new examiner code should be assigned.

Each examiner should maintain sequential plot or polygon numbers for a given year and purpose of data collection. It is very important that the Forest and District coordinators assure that there are no duplicate 10-character plot Key_ID codes or duplicate 10-character polygon Key_ID codes. Since plot data cannot be combined with polygon data for analysis, there can be plot codes that are the same as polygon codes.

Example 1: A plot on the Helena NF, Helena RD, for the purpose of big game habitat evaluation, during 1986, by Olsen (Olsen is given the unique examiner code of A), which is the 45th plot for Olsen in calendar year 1986, would be entered:

| 1 2 3 B 8 6 A 0 4 5 |

Example 2: A polygon on the Idaho Panhandle NF, Bonners Ferry RD, for grizzly bear habitat analysis, during 1985, by Houghton (Houghton is given the unique code of 1 for grizzly bear habitat evaluation on the Bonners Ferry RD in 1985), which is the 105th polygon for Houghton in calendar year 1985, would be entered:

| 0 4 7 G 8 5 1 1 0 5 |

If only a small amount of data are collected within a given year, the system can be simplified by giving each examiner on the District a unique code that they will use for all data collection purposes during the year. This can be done as long as the District will not have more than 34 examiners that year, and the examiner will not exceed 999 plots for all purposes during the year.

Field 2 - Examiner - Name of Examiner (10-character alphanumeric code) for Form 1, and a 15-character alphanumeric code for Form 3)

Enter the name of the person doing the majority of the species identification, data measurements, and evaluations. If the full name exceeds the alloted space, abbreviate the first name; e.g., U.BUCKWHEAT

Optional.

Accuracy Standards - No Errors

Field 3 - E or EDIT - Edit Accuracy (one-character alphanumeric code)

Enter one of the following codes:

- - A blank indicates plot data have not been entered into a computer data entry system.

A - Plot data have been entered into a computer data entry system, but the data have not been run through the edit-check program.

E - Plot data have been entered into a computer data entry system, and the data have been run through the edit-check program. Errors have not been corrected.

C - Plot data have been entered into a computer data entry system, and the data have been run through the edit-check program. All severe errors and other real errors have been corrected.

Required.

Accuracy Standards - No Errors

Field 4 - Survey - Survey Type (three-character alphanumeric code)

First character--enter one of the following codes:

A - plot was subjectively located to describe a representative vegetation type within a stand (polygon). Typically used in inventory.

B - plot was subjectively located to be representative of a stand and is used to monitor or describe change in vegetation due to treatment or time. Typically used when monitoring response of vegetation to a vegetation management treatment or when measuring change or trend over time.

C - plot is part of a series of replicated plots which were systematically or randomly located within a stand (polygon) to characterize the stand. Typically used in inventory.

D - plot is part of a series of replicated plots which were systematically or randomly located within a stand (polygon) to characterize a vegetation type within the stand. Typically used in inventory.

E - plot is part of a series of replicated plots which were systematically or randomly located in a treatment or control area to determine change in vegetation due to treatment or time. Typically used when monitoring response of vegetation to a vegetation management treatment or when measuring change or trend over time.

Second character--enter one of the following codes:

- blank indicates accuracy of plot location or permanency of location is not assessed.

P - permanently located plot with stakes and/or measurements to permanent features and a map showing location and plot layout.

L - not a permanently located plot with stakes and/or measurements to permanent features, but accurately located on a 1:24000 or larger scale topographic map or aerial photo to ± 100 feet.

S - not a permanently located plot with stakes or measurements. General plot location is accurate to a stand (polygon) level on a map or aerial photo map base. Examiner is certain based on topographic and vegetation features that the plot occurs in the stand (polygon) it is delineated within.

T - not a permanently located plot with stakes or measurements. General plot location is accurate to the surrounding stands (polygons) on a map or aerial photo map base. Examiner is not certain that the plot occurs in the stand (polygon) delineated, but is fairly sure it is in either that stand (polygon) or one of the adjacent stands (polygons).

G - not a permanently located plot with stakes or measurements. Plot location only known to a general geographic area.

Third character--use this character if the plot is a permanent plot. For a permanent plot, enter the number of years to the next measurement. A blank indicates that the plot is not a permanent plot and is not programmed for remeasurement. A 1 means the plot will be measured annually, a 2 means it will be measured 2 years from now, a 9 means it will be measured 9 years from now. If remeasurement occurs at 10 years, enter a T. For longer intervals enter an A and discuss the interval length in the comments, Field 80.

Optional.

Accuracy Standards - No Errors

Field 5 - Mo - Month (two-digit number)

Enter the code for calendar month:

01	January
02	February
03	March
04	April
05	May
06	June
07	July
08	August
09	September
10	October
11	November
12	December

Optional.

Accuracy Standards - No Errors

Field 6 - Day (two-digit number)

Enter the calendar day. Use a leading 0 if single digit (i.e., 02).

Optional.

Accuracy Standards - No Errors

Field 7 - Project - Project Number or Optional Variable Type (five-character alphanumeric code)

Enter a project code which is unique by Ranger District and purpose. A record of project codes should be kept by the designated Forest Ecosystem Management Coordinator. This field may also be used to code data for a variable which is not covered by the other fields described in this section. If this field is used to record data for an optional variable, be sure to describe the codes used in the appropriate project file. Since optional variables may be recorded in either Field 7 or 15, be sure to denote in the project file if a particular variable is entered in Field 7 or 15.

Optional.

Accuracy Standards - No Errors

Field 8 - PLT - Plot Types (up to three one-character alphanumeric codes for Form 1, and up to 10 one-character alphanumeric codes for Form 3)

Identify the sampling form(s) used to characterize the plot or polygon by entering the following codes:

1 = Recon Data--Form 1
2 = Fastplot Plant Species Data--Form 2
3 = General Plot Data--Form 3 (This form is required when either Forms 2, 4, 5, or 6 are used)
4 = Ocular Plant Species Data--Form 4
5 = Cover Microplot Plant Species Data--Form 5
6 = Nested Microplot Plant Species Data--Form 6
7 = Line Intercept Canopy Cover Data--Form 7
8 = Density Data--Form 8
9 = Production Data--Form 9
A = Short Nested Microplot Plant Species Data--Form A
B = Point Cover Data--Form B
C = Optional Plant Species Attribute Data--Form C

Example: An ocular macroplot with density counts of big game pellets and livestock cowpies, with line intercept cover measurements of shrub species would be entered as:

| 3 4 7 8 _ _ _ _ _ _ |

The above indicates that General Plot Data, Ocular Plant Species Data, Line Intercept Canopy Cover Data, and Density Data Forms were used to characterize the macroplot.

Required.

Accuracy Standards - No Errors

Field 9 - PltRL - Plot Radius or Length (up to a three-digit number)

Enter macroplot radius (for circular plots) or length (for rectangular plots) in feet.

Required.

Accuracy Standards - $\pm$ 0.5 foot

Field 10 - Plot W - Plot Width (up to a three-digit number)

Enter macroplot width in feet if a rectangular plot shape is used. Enter 000 (numeric) if a circular plot shape is used.

Required.

Accuracy Standards - ± 0.5 foot

Field 11 - Quad - Map Quad Name or Code (12-character alphanumeric code)

For Form 3, enter a unique Forest code or the name of the quad map. For Form 1, enter the above or a photo identifier; etc., as needs dictate.

Optional.

Accuracy Standards - No Errors

Field 12 - Satellite - Satellite Photography Spectral Scene (12-character alphanumeric code)

Enter the date (month/day/year) of the scene in the first six characters.

Enter a code to denote satellite flight identification in the second six characters.

Optional.

Accuracy Standards - No Errors

Field 13 - Aerial Photo - Date and Identification of Aerial Photography Used for Plot or Polygon Location (21-character alphanumeric code)

In the first six characters enter the date (month/day/year) of the aerial photography.

In the next 15 characters enter a photo identification number that identifies the flight line and photo along the flight.

Optional.

Accuracy Standards - No Errors

Field 14 - Spectral - Spectral Class From Satellite Imagery Analysis (three-character alphanumeric code)

Enter a unique code to denote the spectral class developed from an analysis of one or more bands of satellite imagery spectral data.

Optional.

Accuracy Standards - No Errors

Field 15 - PI - Photo Interpretation Type or Optional Variable Type (five-character alphanumeric code)

Enter a unique code to denote the photo type developed from an analysis of aerial photography. This field may also be used to code data for a variable which is not covered by the other fields described in this section. If this field is used to record data for an optional variable, be sure to describe the codes used in the appropriate project file. Since optional variables may be recorded in either Field 7 or 15, be sure to denote in the project file if a particular variable is entered in Field 7 or 15.

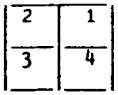
Optional.

Accuracy Standards - No Errors

Field 16 - Legal_ID - Legal Location (10-character alphanumeric code)

Enter the legal location based on Township (3 characters; e.g., 36N), Range (3 characters; e.g., 05W), Section (2 digits; e.g., 05), 1/4 section (1-digit), and 1/4 of 1/4 section (1-digit).

Numeric values for quarter section assignments are as follows:



Optional.

Accuracy Standards - No Errors

Field 17 - UTM - Universal Transverse Mercator Grid (16-digit number)

Enter up to seven digits corresponding to the N coordinate, then up to seven digits corresponding to the E coordinate and two digits corresponding to the zone. The zone coordinate is required if the N and E coordinates are entered.

Be sure to enter the date of the UTM projection in the project folder or in the comments (Field 80). Most quads have the 1927 UTM projection, but some revised quads will have a new 1983 projection. The 1983 projection is different than the 1927 projection. In order to cross-reference locations projection dates are needed.

Optional; but plot location as a point, with its Key_ID code identified on a photo or contour map (of scale 1:24000 or larger) stored within the project file is required.

Accuracy Standards - No Error

Field 18 - WL_MUStrata - Wildlife Map Unit Strata (six-character alphanumeric code)

Enter an appropriate wildlife map unit strata code.

Optional.

Accuracy Standards - No Errors

Field 19 - Tmbr Strata - Timber Map Unit Strata (six-character alphanumeric code)

Enter an appropriate timber map unit strata code.

Required, if the area is in a mapped timber stand that has existing data or is programmed for future stand exam.

Accuracy Standards - No Errors

Field 20 - TS_ID - Timber Stand Identification (seven-digit stand number, with two, two-digit plot numbers)

Complete the following codes if applicable:

TCO or CO - Compartment (two-digit number)
TSC or SC - Subcompartment (two-digit number)

TStnd or ST - Stand (three-digit number)
PL - Plots (two, two-digit numbers); enter the beginning and ending plot numbers which are being correlated with the macroplot.

Required for compartment, subcompartment and stand for areas which have been mapped in the timber data base. Map delineation refinements may be necessary for areas with non-timber vegetation; i.e., rangelands. Since the Timber Stand Identification Codes are unique throughout the Region, such refinements of either compartment, subcompartment or stand boundaries and codes must be coordinated with appropriate Timber Management personnel on the Forest.

Accuracy Standards - No Errors

Field 21 - Rnge or Range - Range Allotment, Map Unit and Extension (10-character alphanumeric code)

Complete the following codes if applicable:

Allot - Allotment (five-character alphanumeric code)
MU - Map Unit (three-digit number)
EXT - Extension (two-character alphanumeric code)

Required for purposes R and M (see Field 1) or when correlation with other inventories is desired.

Accuracy Standards - No Errors

Field 22 - Ra-Ty - Range Type (Three-character alphanumeric code)

The first character indicates whether the polygon is within a riparian area. A riparian map unit is one that has aquatic or riparian ecosystem type characteristics (Appendix A). Enter one of the following codes to denote map unit riparian status:

1 - a nonriparian map unit is being described
2 - a riparian map unit is being described

The second two characters are the Range Type code from the list below. Range Type is the existing vegetation; i.e., cover type, and not the potential vegetation type. Use the following criteria to evaluate Range Type status at a site:

01 - grassland (uplands and benches with normal seasonal soil moisture regimes; ≥ 10% canopy cover total vegetation; < 10% canopy cover tree saplings and larger; <5% canopy cover mid and tall shrubs (i.e., those > 6" height); graminoid cover ≥ forb cover).

02 - meadow (bottomlands, draws and benches with moisture regimes that are in excess of surrounding uplands such that vegetation continues growth into the hot season; ≥ 10% cover total vegetation; < 10% canopy cover tree saplings and larger; < 5 % canopy cover mid and tall shrubs (i.e., those > 6" height); graminoid cover ≥ forb cover).

03 - perennial forb (≥ 10% canopy cover total vegetation; < 10% canopy cover tree saplings and larger; < 5 % canopy cover mid and tall shrubs (i.e., those > 6" height); forb cover > graminoid cover).

04 - sagebrush (≥ 10% canopy cover total vegetation; < 10% canopy cover tree saplings and larger; ≥ 5% canopy cover mid and tall sagebrush (i.e., those Artemisia species > 6" height)).

05 - browse-mountain shrub (≥ 10% canopy cover total vegetation; < 10% canopy cover tree saplings and larger; ≥ 5% canopy cover mid and tall shrubs (i.e., those > 6" height excluding Artemisia species)).

06 - conifer - with undergrowth forage (≥ 10% canopy cover sapling and larger trees; conifer canopy cover > broadleaf tree canopy cover; > 50 pounds/acre understory forage).

07 - conifer - without undergrowth forage (≥ 10% canopy cover sapling and larger trees; conifer canopy cover > broadleaf tree canopy cover; ≤ 50 pounds/acre understory forage).

08 - rock or barren (< 10% total vegetation cover).

10 - broadleaf trees (≥ 10% canopy cover sapling and larger broadleaf trees; canopy cover of broadleaf trees ≥ conifer trees).

19 - badlands (map units that include a dissected mosaic of grassland and/or shrublands with inclusions of nonvegetated areas and conifer or broadleaf types, where erosion has cut the landscape into an intricate maze of narrow ravines and sharp crests and pinnacles).

Required if purpose is R and M (see Field 1).

Accuracy Standards - No Errors

Field 23 - Cap Area - Forest Capability Area (six-character alphanumeric code)

Enter the appropriate code from the Forest Plan.

Required if data are to be correlated with the Forest Plan data base or area level analysis.

Accuracy Standards - No Errors

Field 24 - ComPlot - Comparison Plot (10-character alphanumeric code)

Enter the appropriate Key_ID for a plot to be used as a comparison with the plot identified in Field 1 (e.g., control plot, pre-treatment plot, etc.). For remeasurement of permanent plots, enter the Key_ID for the first time the plot was measured. To sort plots for comparison, the initial plot Key_ID is recorded in this field for all subsequent plot sampling efforts.

Required for permanent plots. Optional for all others.

Accuracy Standards - No Error

FIELDS 25 TO 31 ARE USED IN VEGETATION MAPPING PROJECTS

Field 25 - Rep - Representation (one-digit number)

For Recon Data (Form 1) - enter the code which best describes vegetation type variability within the polygon from the list below.

1 - polygon is a complex, such that two or more vegetation types each make up at least 20 percent of the polygon area. Additionally, there are no inclusions of dissimilar vegetation types.

2 - polygon is a complex with inclusions, such that two or more vegetation types each make up at least 20 percent of the polygon area. Additionally, there are one or more inclusions of dissimilar vegetation types.

3 - polygon has one vegetation type that is 80 percent or more of the polygon. Additionally, there are one or more dissimilar vegetation type inclusions.

4 - polygon has one vegetation type that makes up the total polygon.

For General Plot Data (Form 3) - this code indicates how the plot represents a larger area of surrounding vegetation or a polygon. It is typically used for correlating plot data with existing mapped strata, photo interpretation types or spectral classes from LANDSAT data. Enter the appropriate code from below.

1 - plot represents a surrounding vegetation type which is part of a complex in the map polygon, and comprises greater than 20 percent of the polygon area.

2 - plot represents a surrounding vegetation type which is an inclusion in the map polygon, and comprises less than 20 percent of the polygon area.

3 - plot represents a surrounding vegetation type which comprises 80 percent or more of the polygon area, but the polygon has inclusions of dissimilar vegetation types.

4 - plot represents a vegetation type which is the only vegetation type within the polygon. The polygon is not a complex and does not have inclusions of dissimilar vegetation types.

Required for mapping project plots which need to be correlated with polygons.

Accuracy Standards - Good Judgment

Field 26 - GDA - Geographic Description Area Identification Code (two-character alphanumeric code)

This field is used when an area has not been mapped with a hierarchial numbering system that uniquely identifies each polygon, such as the timber compartment stand numbering system (Field 20) and the range allotment map unit numbering system (Field 21). If these systems have not been established or if different criteria of

map delineation are being used, geographic description areas (GDAs) may be mapped. A unique code must be given each GDA within the project (Field 7).

Enter a two-character code that uniquely identifies the area to be mapped.

Optional.

Accuracy Standards - No Error in Comparison to the Map Base

Field 27 - Po# or Pol# - Polygon Number (two-digit number)

This field is used when describing a polygon in a geographic description area (GDA). Each polygon within the GDA is given a unique number. Vegetation types within each polygon are then numbered and described using the Recon or other sampling method.

Enter a unique number for the map polygon within the GDA. Number polygons in the sequence they are visited and described within the GDA. If you encounter more than 99 polygons in a mapping or sampling area, split the area into two GDAs, each with a unique project number. **Be sure you only number sampled polygons within a GDA.**

Required for mapping project plots which need to be correlated with polygons.

Accuracy Standards - No Error in Comparison to the Map Base

Field 28 - VT - Vegetation Type (one-character alphanumeric code)

This code is used to identify vegetation types within a polygon. Vegetation types are numbered, described, and assigned a percentage of the polygon area they comprise.

Enter a 1 for the first vegetation type in the polygon that is described. Enter a 2 if the second vegetation type in the polygon is being described. Continue for as many vegetation types that occur in the polygon; use A to denote the 10th plot, B for the 11th plot, etc. Not all vegetation types have to be described; only those that are considered important for the project. If all vegetation types in a stand or polygon are numbered and described, then percentages in Field 29 for all the vegetation types described in one polygon should total 100 percent.

Required if describing vegetation type variability within polygons.

Accuracy Standards - Good Judgment

Field 29 - %Po - Vegetation Type Percentage (two-digit number)

Enter the percent area that the vegetation type sampled, as a sum of its discrete units in the polygon, makes up of the total. This will be to the nearest percent, if it is 100 percent enter 99.

Required if describing vegetation type variability within polygons.

Accuracy Standards - $\pm$ 10 percent

Field 30 - Community Size - Size of Community (three-digit number)

Enter an estimated size in acres of the plant community the macro plot or Recon description represents. This will usually be the size of the contiguous community surrounding the sampled plot; however, it may also include other spatially separated expressions of the same community dependent on study needs. Denote in the comments (Field 80) if contiguous community acreage or spatially separated acreages are being recorded in this field.

Required for Form 3 if Field 25 is recorded.

Accuracy Standards - Good Judgment

Field 31 - Community Shape (two-digit number)

Evaluate the primary shape of the contiguous plant community that the plot or recon description represents. Enter the most appropriate code from the list below.

1 - linear; community is long and narrow; $\geq$ 10 times as long as wide.
2 - rectangular.
3 - greater than 4-sided; e.g., octagon.
4 - oblong or elliptical; community is $\geq$ 4 times as long as wide.
5 - rotund or round; $<$ 4 times as long as wide.
6 - irregular; doesn't fit other descriptions.

Optional.

Accuracy Standards - Good Judgment

Field 32 - E1 or Eco Type(1) - Ecosystem Type 1 (one-character alphanumeric code)

Identify the ecosystem type by using the key provided in Appendix A. Enter the appropriate code from the list below.

A = aquatic
B = nonvegetated terrestrial
C = coniferous
D = juniper
E = woodland (deciduous broadleaves)
F = shrub dominated wetland
H = herbaceous dominated wetland
J = shrub dominated alpine
K = forb dominated alpine
L = graminoid dominated alpine
M = shrubland, shrub-steppe, or mountain shrub
N = grassland, grass-steppe or mountain grass

Required.

Accuracy Standards - Good Judgment. If questionable, enter a second possibility in Field 34 and make notes concerning the problem in the comments (Field 80).

Field 33 - PotTyp1/SCT1 - Potential Natural Community Type or Habitat Type, and Seral Community Type Number 1 (six-character alphanumeric code)

Identify, in the first four characters, the potential vegetation of the plot using the codes provided in Appendix A. Always consult the appropriate habitat type classification manuscript for your area when determining habitat type status for a site.

Identify, in the fifth and sixth characters, the seral community type of the site. This subfield is recorded when the vegetation of the site differs from the climax or potential natural community expression, and when a suitable seral community classification exists for the habitat type. Consult the Regional Office for appropriate seral community type codes to be used in your area.

Required, if there is a classification available for the ecosystem.

Accuracy Standards - Accurate to habitat type phase if possible. If questionable, make a second choice in Field 35 and make notes concerning the problem in the comments (Field 80).

Field 34 - E2 or Eco Type(2) - Ecosystem Type 2 (one-character alphanumeric code)

If your first determination is questionable, enter the next best determination using the key and codes provided in Appendix A.

Optional.

Accuracy Standards - Good Judgment

Field 35 - PotTyp2/SCT2 - Potential Natural Community Type or Habitat Type, and Seral Community Type Number 2 (six-character alphanumeric code)

If your first determination is questionable, enter the next best determination using the appropriate key and enter the code.

Optional.

Accuracy Standards - Accurate to phase if possible

Field 36 - SMU - Soil Survey Map Unit or Landtype Symbol (up to a five-character alphanumeric code).

Enter the appropriate symbol from the soil survey or landtype map of the area. Prior to use of this field, each Forest should develop a SMU code list.

Required if there is a map and legend for the area.

Accuracy Standards - No Errors

Field 37 - Soil Taxon (up to a 12-character alphanumeric code)

Enter the appropriate Soil Taxonomic Unit code for the plot. Consult the Regional Office for codes to be used.

Optional.

Accuracy Standards - No Errors

Field 38 - PM - Parent material (two-digit number)

Enter the appropriate parent material code from the list below.

Basic Rock Type	Code #	Specific Rock Type
SEDIMENTARY		
	1	Limestone (pure & impure)
	2	Dolomite (pure & impure)
	3	Sandstone
	4	Calcareous sandstone
	5	Siltstone
	6	Calcareous siltstone
	7	Shale
	8	Red Shale (colors soils)
	9	Calcareous shale
	10	Conglomerate
	11	Calcareous conglomerate
	19	Sedimentary - type unknown
METAMORPHIC		
	20	Argillite
	21	Calcareous argillite
	22	Siltite
	23	Quartzite
	24	Slate
	25	Phyllite
	26	Schist
	27	Biotite schist
	28	Mica schist
	29	Gneiss and biotite gneiss
	39	Metamorphic - type unknown
IGNEOUS		
	40	Basalt (including obsidian)
	41	Andesite
	42	Diorite to gabbro
	43	Latite
	44	Quartz monzonite
	45	Trachyte & syenite
	46	Rhyolite
	47	Granite & biotite granite
	48	Welded tuff (Tufa)
	49	Scoria (porcellanite), clinker
	59	Igneous - type unknown
MISCELLANEOUS		
	60	Gravelly alluvium
	61	Sandy alluvium
	62	Silty alluvium
	63	Clayey alluvium
	64	Mixed alluvium

Basic Rock Type	Code #	Specific Rock Type
MISCELLANEOUS		
	65	Glacial till, mixed origin
	66	Ash (of any origin)
	67	Mixed sedimentary
	68	Mixed metamorphic
	69	Mixed igneous
	70	Loess
	71	Mixed from two or more rock types

Required.

Accuracy Standards - No Errors

Field 39 - Geomorphic Landform (two-digit number).

Enter the appropriate geomorphic landform code from the list below. Contact the Regional Office for descriptive guides to the codes presented.

Basic Landform	Code #	Geomorphic Landform Type
RESIDUAL MOUNTAIN SLOPES AND RIDGES		
	1	Dissected straight slopes
	2	Dissected convex slopes
	3	Undissected slopes
	4	Ridges
	5	Depressions
	9	Other type
GLACIATED MOUNTAIN SLOPES AND RIDGES		
	10	Undissected slopes
	11	Dissected slopes
	12	Ridges
	19	Other type
ALPINE GLACIAL VALLEYS		
	20	Trough bottoms
	21	Undissected troughwalls
	22	Dissected troughwalls
	23	Avalanche paths and debris fans
	29	Other type
ALPINE GLACIAL RIDGES		
	30	Cirque basins
	31	Cirque headwalls and alpine ridges
	32	Undulating uplands
	39	Other type

Basic Landform	Code #	Geomorphic Landform Type
ROLLING UPLAND LANDSCAPES		
	40	Low relief rolling uplands
	41	Low relief uplands, dense drainage
	42	Moderate relief rolling uplands
	43	Dissected rolling uplands
	49	Other type
BREAKLANDS		
	50	Dissected river breaks
	51	Undissected river breaks
	52	Structural breaks
	53	Stream headlands
	59	Other type
STRUCTURALLY CONTROLLED MOUNTAIN SLOPES		
	60	Dip slopes
	61	Dipping layered rocks
	62	Plateaus
	69	Other type
GLACIAL TILL FORMS		
	70	Moraines
	71	Drumlins
	72	Kames and kettles
	79	Other type
ALLUVIAL-COLLUVIAL-LACUSTRINE FORMS		
	80	Flood plains
	81	Terraces
	82	Alluvial fans
	83	Colluvial fans
	84	Colluvial basins and toeslopes
	85	Alluvial basins
	89	Other type
MASS WASTED SLOPES		
	90	Landslides
	99	Other type

Optional.

Accuracy Standards - Good Judgment

Field 40 - Pol Pos - Plot Position or Polygon Position (up to four, one-character alphanumeric codes for Form 1; one-character alphanumeric code for Form 3)

Enter the appropriate position code(s) that the vegetation type being described occurs in within the plot or polygon from the list below.

Code	Position
B	Wide valley bottom (> 0.5 miles wide)
S	Slope in a wide valley bottom
R	Ridgetop or rounded knoll in wide valley bottom
F	Flat or plains not in mountainous terrain
V	Narrow valley bottom (100 ft. - 0.5 miles wide)
D	Draw (< 100 ft. wide)
1	Toeslope
2	Footslope
3	Lower slope
M	Mid slope
4	Upper slope
5	Shoulder
6	Bench or terrace in mountainous terrain
7	Narrow ridge
8	Platform summit or broad ridge summit
9	Saddle, gap, or pass on a ridge
G	Short slope, neither upper nor lower

Required.

Accuracy Standards - Good Judgment

Field 41 - Shp - Slope Shape (up to two, one-character alphanumeric codes for Form 1; one-character alphanumeric code for Form 3)

Enter the appropriate slope shape code(s) that the vegetation type being described occurs in within the plot or polygon from the list below.

Code	Slope Shape
1	Even or straight
2	Convex or rounded
3	Concave or depression
4	Patterned (microrelief of hummock & swale or other)
5	Undulating pattern of low relief ridges or knolls and draws

Required.

Accuracy Standards - Good Judgment

Field 42 - Asp - Aspect (two-character alphanumeric code for Form 1; up to a three-digit number for Form 3)

For Recon Data (Form 1), a general aspect class code is entered for the vegetation type being described within the polygon. Use the aspect class codes provided below.

Code	Aspect	Range	Midpoint
F -	level or rolling	0	0
N -	north	337-22	360
NE -	northeast	23-67	45
E -	east	68-112	90
SE -	southeast	113-157	135
S -	south	158-202	180
SW -	southwest	203-247	225
W -	west	248-292	270
NW -	northwest	293-336	315

For General Plot Data (Form 3), aspect is the direction which the plot faces and can range from 1 to 360 degrees. Measure using a compass. Enter the appropriate aspect in degrees. Denote flat areas as 001.

Enter the declination for the area in the project folder or in the comments (Field 80).

Required.

Accuracy Standards - ± 5 degrees

Field 43 - Slp - Slope Percent (one-character alphanumeric code for Form 1; up to a three-digit number for Form 3)

For Recon Data (Form 1), enter the slope class for the vegetation type being described within the polygon. Codes for slope classes are given below.

Code	Class	Midpoint
0 =	0 - 10%	5%
1 =	11 - 20%	15%
2 =	21 - 30%	25%
3 =	31 - 40%	35%

Code	Class	Midpoint
4 =	41 - 50%	45%
5 =	51 - 60%	55%
6 =	61 - 70%	65%
7 =	71 - 80%	75%
8 =	81 - 90%	85%
9 =	> 91%	---

For General Plot Data (Form 3), slope percent of the plot is the average percent slope of the terrain on which the sample plot is located. Measure percent slope, with a clinometer, directly uphill and directly downhill from the sample plot center and record the average of these two measurements to the nearest whole percent. Be sure to measure slope percent (rise/run x 100) and not degrees. If the slope is between (or including) 0 and 1.5 percent, enter 001.

Required.

Accuracy Standards - ± 10 percent

Field 44 - Elv - Elevation in feet (three-digit number for Form 1; up to a five-digit number for Form 3)

For Recon Data (Form 1), enter the elevation of the vegetation type being described to the closest 100 feet. An elevation of 5200 would be entered as 0 5 2 . An elevation of 10,500 feet would be entered as 1 0 5 .

For General Plot Data (Form 3), enter the elevation of the plot in feet.

Use a topographic map or altimeter to estimate elevation.

Required.

Accuracy Standards - ± 100 feet

Field 45 - Micro Climate (one-character alphanumeric code)

Enter one of the following codes as appropriate:

1 - cold air drainage or frost pocket
2 - wind blasted environments which maintain vegetation in a deformed state
3 - snow accumulation - late snowmelt areas
4 - upslope warm air flow; area that is in the direct path of afternoon warm air upslope flow from an adjacent deep valley bottom.

Coordinate with the Regional Office for additional codes.

Optional.

Accuracy Standards - Good Judgment

COMPLETE PLANT SPECIES DATA BEFORE COMPLETING THE REMAINDER OF THE RECON DATA OR GENERAL PLOT DATA

Field 46 - SSS - Soil Surface Change or Status (one-character alphanumeric code).

Enter the appropriate code based on indicators of soil cover, sheet erosion, rill erosion, bank stability, gullying, etc. Instability includes situations where man's activities have increased the rates of disturbance above that which would occur naturally.

1 soil surface stable and cover adequate to prevent erosion in excess of natural.

2 soil surface is stable; cover is inadequate; trend is toward increased erosion.

3 soil surface is unstable; cover is inadequate; trend is toward increased erosion.

4 soil surface is unstable; cover is inadequate but increasing; trend is toward stability.

5 soil surface is unstable because of compaction (weight per unit volume > natural) causing increased runoff.

Required.

Accuracy Standards - Good Judgment

Field 47 - ErT - Erosion Type (one-character alphanumeric code)

Enter one of the following codes to denote the type of erosion on the plot.

0 none
1 sheet erosion
2 rill erosion
3 sheet and rill erosion
4 gully erosion
5 sheet and gully erosion
6 gully and rill erosion

7	gully, rill, and sheet erosion
8	deposition
9	wind erosion
A	soil creep
B	slump-earth flow
C	terrace development

Required.

Accuracy Standards - Good Judgment

Field 48 - Erosion or Deposition Depth (up to a three-digit number)

Enter an estimated average erosion depth for the plot to the nearest 1/10-inch. For example, an average of 1.2 inches of erosion would be entered as | 0 1 2 |. If gullies are present, enter the average depth of gullies. If gullies are not present but sheet erosion is, enter the average depth of mineral soil erosion or the average depth of deposition. If gullies and sheet erosion are not present, but rills are, enter the average depth of rills. If erosion depth is between (or including) 0 and 1/10-inch, enter 001.

Optional.

Accuracy Standards - Good Judgment

Field 49 - Percent of Area Eroded or Deposited (up to a two-digit number)

Enter the percent of the plot experiencing erosion or deposition. If it is 100 percent, enter 99. If the value is between (or including) 0 and 1.5 percent, enter 01.

Optional.

Accuracy Standards - ± 10 percent

IF THE COVER MICROPLOT, NESTED MICROPLOT, OR POINT COVER METHODS ARE USED, THE FOLLOWING EIGHT ESTIMATES OF SOIL SURFACE COVER SHOULD NOT BE ENTERED UNTIL GROUND COVER POINT DATA HAVE BEEN SUMMARIZED. ONCE THEY ARE SUMMARIZED INTO PERCENT COVER, ENTER EACH AS A COVER CLASS BY GROUND COVER VARIABLE.

Field 50 - Ground Cover (eight, one-character alphanumeric codes)

Estimate cover class codes at the soil surface level for each of the following ground cover categories.

S - bare soil (< 1/16-in. diameter soil particles)
G - gravel (1/16 - 3-in. diameter)
R - rock (> 3-in. diameter)
L - litter and duff; litter includes freshly fallen leaves, needles, twigs, bark, and fruits; duff is the fermentation and humus sections of the organic layer.
W - wood; downed wood that is greater than 1/4-in. diameter.
M - moss; does not include vascular plants like Lycopodium spp. and Selaginella spp.
BV - basal vegetation; the soil covered by the basal or root crown portion of plants; this is not the foliar cover of plants; typical values for basal plant cover range between 10 and 20 percent; 30 percent is a very high value and is rarely encountered in the Northern Region.
O - other; if an additional category (e.g., lichen) is needed use this character and identify the item in the comments (Field 80).

Use the following standard cover class codes in estimating ground cover by categories.

Code	Range of Class	Midpoint
0	0 - 0% cover	0%
T -	>0 - < 1% cover	0.5%
P -	1 - < 5% cover	3.0%
1 -	5 - < 15% cover	10.0%
2 -	15 - < 25% cover	20.0%
3 -	25 - < 35% cover	30.0%
4 -	35 - < 45% cover	40.0%
5 -	45 - < 55% cover	50.0%
6 -	55 - < 65% cover	60.0%
7 -	65 - < 75% cover	70.0%
8 -	75 - < 85% cover	80.0%
9 -	85 - < 95% cover	90.0%
F -	95 - 100% cover	97.5%

Required.

Accuracy Standard - ± 1 Class

NOTE: PERCENTAGES FOR THE EIGHT GROUND COVER CATEGORIES SHOULD TOTAL TO APPROXIMATELY 100 PERCENT. SINCE COVER CLASSES ARE ENTERED, THE TOTAL OF MIDPOINTS MAY BE SLIGHTLY LESS OR SLIGHTLY MORE THAN 100 PERCENT.

Field 51 - SpFe - Special Feature (two-digit number)

Enter one of the following codes to denote the special feature on which the plot is located.

Code	Special Feature
99	not applicable
01	avalanche chute with non-scoured surface (soil not being eroded)
02	avalanche chute with scoured surface (soil eroded, rocks exposed)
03	talus (rock fragments derived from and positioned at the base of a cliff)
04	scree (sheet of stones or rocky debris mantling a slope)
06	sand or gravel bar community within stream or river channel
07	wet meadow (dominated by grasses; soil surface wet in spring and moist in mid-summer)
08	marsh (sedge dominated; soil surface wet in mid-summer)
09	swamp (shrub dominated; soil surface wet in mid-summer)
10	bog mire (mosses on acidic, wet peat soil)
11	fen mire (reeds and sedges on alkaline, wet peat soil)
12	swale (concave or bench area with no surface water, but moist surface soil produces vegetation reflecting moist environment)
13	seep (lower concave or bench area with surface water creating moist surface soil that produces vegetation reflecting moist environment)

Code	Special Feature
14	community that is adjacent to surface water--stream, river, pond or lake (surface water should be within 3 feet vertical and 100 feet horizontal)
15	terrace in valley bottom adjacent to water (> 3 feet vertical and within 100 feet horizontal)
16	snow catchment area (retains snow cover 2-4 weeks longer than surrounding areas of same aspect due to deeper snow accumulation)
17	floating or quaking bog or fen mat

To coordinate additional codes contact the Regional Office.

Required.

Accuracy Standards - Good Judgment

Field 52 - Basal Area (up to a three-digit number)

Use a variable factor prism, angle gauge, or relascope to count number of trees that are greater than the view factor from the center point of the plot.

Enter the basal area factor (BAF) in the appropriate place on the form. A BAF of 10 usually works fairly well for open stands on a 1/10-acre plot. A BAF of 20 or 40 works better for denser stands where trees might hide each other. A BAF of 5 works fairly well for sparse parklike stands. The appropriate BAF for a plot will identify at least seven to 10 trees.

Count the number of trees that have a width at breast height greater than the projected angle. Enter this value in the appropriate place on the form (i.e., No. Trees).

Enter the basal area in square feet per acre, for all living trees collectively. Determine basal area by multiplying the number of trees counted by the basal area factor. For additional information, consult the Timber Management Data Handbook (FSH 2409.21h), Chapter 400.

If the basal area is between (or equal to) 0 and 1.5, enter 001.

Optional.

Accuracy Standards - ± 1 tree count times the BAF

Field 53 - DBH-Dom - Mean Diameter Breast Height of the Dominant Tree Layer (up to a two-digit number)

Estimate (from several measurements and an ocular evaluation) the average diameter at breast height of the dominant tree layer in inches. If the DBH is between (or equal to) 0 and 1.5, enter 01.

Optional.

Accuracy Standards - ± 1 in. when d.b.h. < 10 in.
± 2 in. when d.b.h. ≥ 10 in.

Field 54 - Str or Struc - Structural or Physiognomic Class of the Vegetation Within the Plot or Vegetation Type (one-character alphanumeric code)

Enter the appropriate code from below.

Code	Structural or Physiognomic Class
0	nonvegetated or moss (< 10 percent tree, shrub or herb foliar canopy cover (CC))
1	herbaceous or herbaceous/tree seedling (< 10 percent CC sapling size (i.e, 1.0 - 4.9 in. d.b.h.) and larger trees; < 10 percent CC shrubs)
2	shrub or shrub/tree seedling (≥ 10 percent CC shrubs; < 10 percent CC sapling and larger trees)
3	sapling (≥ 10 percent CC sapling trees; ≤ 10 percent CC pole size and larger trees (i.e., 5.0 - 8.9 in. d.b.h.)
4	pole/sapling trees (> 10 percent CC pole size and larger trees; < 10 percent CC trees larger than pole size; about 50-100-year old trees)
5	young-mature trees (≥ 10 percent CC trees larger than pole size; some trees showing decadence; about 100-200-year old trees)
6	old growth trees (≥ 10 percent CC trees larger than pole size; past full maturity; showing decadence; 0.5 snag/acre; ≥ 2 canopy levels; overstory canopy closing to 10-40 percent or more; overstory + understory canopy > 70 percent; 3+ in. logs on the ground)

Code	Structural or Physiognomic Class
8	krumholtz trees/shrub or herb (trees in a deformed state due to wind, cold and stress)

Use the age/size class criteria presented in Section 4.53 (Field 7) of this document when calculating physiognomic class for broadleaf trees.

Required.

Accuracy Standards - Good Judgment

Field 55 - VeC - Vegetation Change Indicator (one-character alphanumeric code)

Enter the appropriate code to indicate if the existing community, given present conditions, will change its appearance to that of the potential or climax community for the site.

1	community is stable (will not change significantly in canopy closure, structure or species composition within the next 10 years) and is similar in appearance to the potential or climax community.
2	community is seral and changing toward the potential or climax community (will change significantly in canopy closure, structure or species composition within the next 10 years).
3	community is changing away from the potential or climax community (will change significantly in canopy closure, structure or species composition within the next 10 years).
4	community is seral and stable (will not change significantly in canopy closure, structure or species composition within the next 10 years).
5	cannot determine if the community is stable or changing.

Required.

Accuracy Standards - Good Judgment

Field 56 - TrC - Total Tree Cover (one-character alphanumeric code)

Estimate the percent canopy cover for trees as a life form. This **estimate is not the sum of all tree species and does not count overlap.** It is the horizontal percent cover of the vertical projection of trees as a life form. Enter the appropriate percent cover class using one of the following standard cover class codes.

Code	Range of Class
0	0%
T	0.1 < 1%
P	1 < 5%
1	5 < 15%
2	15 < 25%
3	25 < 35%
4	35 < 45%
5	45 < 55%
6	55 < 65%
7	65 < 75%
8	75 < 85%
9	85 < 95%
F	95 - 100%

Required.

Accuracy Standards - ± 1 class

Field 57 - Pole+ - Canopy Cover for Pole Size and Larger Trees (one-character alphanumeric code)

Estimate the percent canopy cover for pole size (5.0 - 8.9 in. d.b.h.); and larger trees as a group. **This estimate is not the sum of such tree species and does not count overlap.** It is the horizontal percent cover of the vertical projection of pole size and larger trees as a group. Enter the appropriate percent class using the standard cover class codes presented in Field 56.

Optional.

Accuracy Standards - ± 1 class

Field 58 - Sapling - Canopy Cover for Sapling Size Trees (one-character alphanumeric code)

Estimate the percent canopy cover for sapling size (1.0 - 4.9 in. d.b.h.) trees as a group. **This estimate is not the sum of such tree species and does not count overlap.** It is the horizontal percent cover of the vertical projection of sapling size trees as a group. Enter the appropriate percent class using the standard cover class codes presented in Field 56.

Optional.

Accuracy Standards - ± 1 class

Field 59 - Seedling - Canopy Cover for Seedling Size Trees (one-character alphanumeric code)

Estimate the percentage canopy cover of seedling size (<1.0 in. d.b.h.) trees as a group. **This estimate is not the sum of such tree species and does not count overlap.** It is the horizontal percent cover of the vertical projection of seedling size trees as a group. Enter the appropriate percent class using the standard cover class codes presented in Field 56.

Optional.

Accuracy Standards - ± 1 class

Field 60 - ShC - Total Shrub Cover (one-character alphanumeric code)

Estimate the percent canopy cover for shrubs as a life form. **This estimate is not the sum of all shrub species and does not count overlap.** It is the horizontal percent cover of the vertical projection of shrub species as a life form. Enter the appropriate percent class using the standard cover class codes presented in Field 56.

Required.

Accuracy Standards - ± 1 class

Field 61 - Tall Shrub - Canopy Cover of Tall Shrubs (one-character alphanumeric code)

Estimate the percent canopy cover for tall shrubs (those > 4.5 ft. in height) as a group. This estimate is not the sum of such shrub species and does not count overlap. It is the horizontal percent cover of the vertical projection of tall shrubs as a group. Enter the appropriate percent class using the standard cover class codes presented in Field 56.

Optional.

Accuracy Standards - ± 1 class

Field 62 - Mid Shrub - Canopy Cover of Medium Shrubs (one-character alphanumeric code)

Estimate the percent canopy cover for medium size (6 in. - 4.5 ft. in height) shrubs as a group. This estimate is not the sum of such shrub species and does not count overlap. It is the horizontal percent cover of the vertical projection of medium size shrubs as a group. Enter the appropriate percent class using the standard cover class codes presented in Field 56.

Optional.

Accuracy Standards - ± 1 class

Field 63 - Low Shrub - Canopy Cover of Low Shrubs (one-character alphanumeric code)

Estimate the percent canopy cover for low shrubs (< 6-in. height) as a group. This estimate is not the sum of such shrub species and does not count overlap. It is the horizontal percent cover of the vertical projection of low size shrubs as a group. Enter the appropriate percent class using the standard cover class codes presented in Field 56.

Optional.

Accuracy Standards - ± 1 class

Field 64 - GrC - Total Graminoid Cover (one-character alphanumeric code)

Estimate the percent canopy cover for graminoids (grasses, sedges, and rushes) as a life form. This estimate is not the sum of all graminoid species and does not count overlap. It is the horizontal percent cover of the vertical projection of graminoid species as a life form. Enter the appropriate percent class using the standard cover class codes presented in Field 56.

Required.

Accuracy Standards - ± 1 class

Field 65 - FrC - Total Forb and Fern Cover (includes Lycopodium spp. and Selaginella spp.) (one-character alphanumeric code)

Estimate the percent canopy cover for forbs and ferns as a life form. This estimate is not the sum of all forb and fern species and does not count overlap. It is the horizontal percent cover of the vertical projection of forbs and ferns as a life form. Enter the appropriate percent class using the standard cover class codes presented in Field 56.

Required.

Accuracy Standards - ± 1 class

Field 66 - Mean age of Dominant Woody Species (up to a four-digit number)

Use an increment bore to count rings from tree or wood cross-sections. Determine the average age in years of the dominant layer and enter that value. If the age is between (or including) 0 and 1.5, enter 0001.

Optional.

Accuracy Standards - ± 10 percent of the actual age

Field 67 - Mean Age of Oldest Woody Species (up to a four-digit number)

Use an increment bore to count rings from tree or wood cross-sections. Determine the average age in years of the oldest trees or shrubs in the stand if they are different from the dominant layer and enter that value. If the age is between (or including) 0 and 1.5, enter 0001.

Optional.

Accuracy Standards - ± 10 percent of the actual age

DO NOT MAKE THE INDIVIDUAL WEIGHT ESTIMATES BY LIFE FORM IN FIELDS 68-70 IF YOU ARE USING THE HERBAGE AND BROWSE PRODUCTION CLASSES IN FIELD 71.

IF USING THE COVER MICROPLOT, NESTED MICROPLOT, OR PRODUCTION SAMPLING METHODS, SUMMARIZE MICROPLOT WEIGHT ESTIMATE DATA BEFORE RECORDING FIELDS 68-70.

Green Wt. - Ocular Estimate of Green Weight by Life Form in Pounds Per Acre

If you prefer to estimate green weight and multiply times a dry weight conversion factor to help estimate dry weight, then estimate green weight in pounds per acre. Current years growth of shrubs (includes leaves and leader growth), graminoids, and forb/ferns is estimated by life form. Understory leaf and leader growth of broadleaf trees less than 7 feet tall is treated as part of the shrub production.

This value is not entered into the data base for analysis.

Optional.

DWF - Dry Weight Factor by Life Form

If you are estimating green weight per acre, enter an estimated dry weight conversion factor expressed as a decimal. Use dry weight factor tables arranged by phenology or data from actual clip and dried material to calculate appropriate dry weight conversion factors. The following dry weight factor table is based on phenological stage and may be used to convert green weight estimates by life form to dry weight values.

ECOSYSTEM CLASSIFICATION HANDBOOK

Phenology Class

Life Form	1,7	2	3,8	4,5	6
Shrub/B.L.Tree	----------	----------	DWF	----------	----------
deciduous-lush	.2-.3	.3-.4	.3-.4	.3-.4	.3-.4
deciduous-fibrous	.3-.4	.4-.5	.4-.5	.4-.5	.4-.5
evergreen-fibrous	-----	.4-.5	.4-.5	.4-.5	.4-.5
Graminoid					
fine leaved	.2-.3	.3-.4	.4-.5	.5-.8	.6-.8
coarse leaved	.1-.2	.2-.3	.4-.5	.5-.7	.6-.7
Forbs					
succulent	.1-.2	.1-.2	.2-.3	.2-.3	.3-.4
fibrous	.2-.3	.2-.3	.3-.4	.3-.4	.4-.5

Typical Date

Low Valleys	April	May	June	July-Aug	October
Montane	May	June	July	August	Sept-Oct
Subalpine	June	July	July	August	September
Alpine	July	July	August	August	September

The phenology classes used in the preceding table are defined as follows:

Shrubs and Broadleaf Trees

1 less than 3/4 leaf development without flowers
2 3/4 to full leaf without flowers
3 flowering with leaves developed
4 seeds developed with leaves developed
5 fruits developed with leaves developed
6 senescent leaves
7 flowers developed prior to 3/4 leaf development
8 no floral development this year, full vegetative growth

Forbs

1 less than 3/4 leaf development without flowers
2 3/4 to full leaf without flowers
3 flowering with leaves developed
4 seeds developed with leaves developed
5 seeds dispersed with leaves developed
6 senescent leaves
8 no floral development this year, full vegetative growth

Graminoids

1 leaves partially developed, no heads
2 inflorescence inside the sheath (in the boot)
3 inflorescence partially exerted from the sheath
4 inflorescence fully exerted from the sheath
5 seed heads dispersed
6 senescent leaves
8 no seed head this year, full vegetative growth

This value is not entered into the data base for analysis.

Optional.

Field 68 - Dry Weight of Graminoids in pounds per acre (up to a five-digit number)

Enter the dry weight of current year graminoid growth in pounds per acre. This value is estimated in the Ocular Method or derived from microplot weights for the Cover Microplot, Nested Microplot, and Production Sampling Methods.

Optional.

Accuracy Standards = ± 20 percent of the true weight (interpreted at the 80 percent confidence level)

Field 69 - Dry Weight of Forbs/Ferns in pounds per acre (includes Lycopodium spp. and Selaginella spp.) (up to a five-digit number)

Enter the dry weight of current year forb and fern growth in pounds per acre. This value is estimated in the Ocular Method or is derived from microplot weights for the Cover Microplot, Nested Microplot, and Production Sampling Methods.

Optional.

Accuracy Standards = ± 20 percent of the true weight (interpreted at the 80 percent confidence level)

Field 70 - Dry Weight of Shrubs in pounds per acre (up to a five-digit number)

Enter the dry weight of shrub leaf and current year leader growth in pounds per acre. Understory leaf and leader growth of broadleaf trees up to 7 feet in height is treated as shrub production. This value is estimated in the Ocular Method or is derived from microplot weights for the Cover Microplot, Nested Microplot, and Production Sampling Methods.

Optional.

Accuracy Standards = ± 20 percent of the true weight (interpreted at the 80 percent confidence level)

Field 71 - HBC - Herbage and Browse Production Class (one-character alphanumeric code)

Enter one of the following codes to denote total herbage (graminoid + forb + fern) and browse (shrub and understory broadleaf trees) plant species production.

Code	Class Range	Midpoint
1	0 - 50 pounds dry weight/acre	25 lb/acre
2	51 - 500 pounds dry weight/acre	275 lb/acre
3	501 - 1500 pounds dry weight/acre	1000 lb/acre
4	1501 - 2500 pounds dry weight/acre	2000 lb/acre
5	2501+ pounds dry weight/acre	3000 lb/acre

Required if Fields 68-70 are not estimated or measured.

Accuracy Standards - within the class

Field 72 - FLC - Fuel Loading Class (two-digit number)

Fuel loading classes are from the fire behavior fuel models of Anderson (1982) and Albini (1976). Enter the appropriate code from the following list. Classes are general and the fuels that will drive the fire behavior model should be emphasized in making the collection. If you are not familiar with this system be sure to use Anderson's 1982 publication and obtain assistance from a qualified fire behavior specialist.

Code	Fuel Loading Class
01	fine, porous and continuous herbaceous fuels of grasslands, savannas, grass-tundra and grass-shrub types.
02	fine herbaceous fuels with some litter and dead stemwood in habitat types with open shrub and forest overstories.
03	tall, thick graminoid dominated stands.
04	forest or shrub stands with a continuous overstory that contain much flammable woody material.
05	forest or shrub stands with light surface fuels and slightly flammable shrub and woody fuels.
06	open forest with shrubs or shrubs that have moderate amounts of flammable woody material.
07	closed forest stands and understory shrub layer with flammable materials in both layers.
08	closed conifer stands with low flammability and a compact litter layer.
09	closed stands of ponderosa pine with a thick litter layer.
10	closed forest types with heavy fuel loading of down woody material.
11	light logging slash, varying in continuity.
12	moderate, continuous logging slash.
13	heavy, continuous logging slash.

Required.

Accuracy Standards - Good Judgment

Field 73 - NFDRS Fuel Model - National Fire Danger Rating System Fuel Model (one-character alphanumeric code)

Enter the appropriate NFDRS fuel model code based on the publication "The National Fire-Danger Rating System - 1978" by Deeming, Burgan, and Cohen (1977). Codes used are as follows:

Fuel Model	Description
A	western grasslands of annual grasses and forbs
B	mature, dense fields of brush $\geq$ 6 feet tall
C	open pine stands with grass-forb ground fuel
D	pine overstory with palmetto-gallberry understory
E	hardwood and mixed hardwood-conifer after leaf fall
F	mature closed chamise and oakbrush
G	dense conifer with heavy litter and downed wood
H	conifer with sparse undergrowth and thin fuels
I	conifer clearcut with small size slash > 25 TPA
J	conifer clearcut with small size slash < 25 TPA
K	thinning-partial cuts with scattered slash
L	western grasslands with perennial grasses
N	sawgrass prairies of south Florida
O	dense, brushlike fuels of the Southeast
P	long-needled southern pines, closed stands
Q	upland Alaska black spruce
R	hardwoods with green leaves
S	Alaskan or alpine tundra on well-drained soils
T	sagebrush/grass
U	western long-needled pines, closed stand

Optional.

Accuracy Standard - Good Judgment

Field 74 - Duff Depth (two-digit number)

Determine the average depth of the duff layer on the plot to the nearest 1/10-inch. Duff is the fermentation and humus sections of the organic layer. It does not include freshly cast material from litter. The top of the duff is where needles, leaves and other castoff material have begun to noticeably decompose. Individual particles will be bound by fungal mycelium. In moss the top of the duff is below the green portion.

Enter the average plot depth of the duff layer to the nearest 1/10-inch. **If the depth is between (or equal to) 0 and 0.1 in., enter 01.**

Optional.

Accuracy Standards - ± 0.5 inch

Field 75 - Litter Depth (two-digit number)

Determine the average depth of the litter layer on the plot to the nearest 1/10-inch. Litter is the surface layer of freshly fallen leaves, needles, twigs, bark, and fruits.

Enter the average plot depth of the litter layer to the nearest 1/10-inch. If the depth is between (or equal to) 0 and 0.1 in., enter 01.

Optional.

Accuracy Standards - ± 0.5 inch

Field 76 - Fuel Depth (two-digit number)

Determine the average depth of ground fuels on the plot to the nearest 1/10-foot. Fuel depth is the vertical distance from the botttom of the litter layer to the highest dead woody fuel particle that is less than 3 inches in diameter.

Enter the average plot depth of fuels to the nearest 1/10-foot. If the depth is between (or equal to) 0 and 0.1 ft., enter 01.

Optional.

Accuracy Standards - ± 0.5-foot

Field 77 - An - Animal Use Evidence (up to two one-character alphanumeric codes for Form 1; up to six one-character alphanumeric codes for Form 3)

Enter the following codes to denote types of animal use on the plot or polygon, in decreasing order of use and effect on the vegetation and site characteristics.

1 = Elk	M = Mountain goat
2 = Deer	P = Porcupine
3 = Moose	G = Pocket gopher
4 = Antelope	H = Horse
5 = Bighorn sheep	S = Ground squirrels
6 = Domestic sheep	B = Bear (species not apparent)
7 = Black bear	R = Rabbit
8 = Grizzly bear	E = Beaver
9 = Cattle	D = Dog

Consult the Regional Office for additional codes.

Optional.

Accuracy Standards - Good Judgment

Field 78 - GCD - Ground Cover Disturbance (one-character alphanumeric code)

Enter one of the following codes to indicate ground disturbance.

Code	Disturbance Class
0	undisturbed (ground cover in stable condition)
1	low (if mechanical or animal disturbance, 5-20 percent of ground cover removed exposing bare soil and pavement; if fire, most fine fuels burned, some charring of 3+ in. fuels, woody plants scorched but not burned to the ground; uneven patch burning of duff and litter)
2	moderate (if mechanical or animal disturbance, 20-40 percent of ground cover removed exposing bare soil and pavement; if fire, nearly all fine fuels consumed, some consumption of 3+ in. fuels, some woody plants consumed; patch distribution of duff and litter consumption)
3	high (if mechanical or animal disturbance, 40-100 percent of ground cover removed exposing bare soil and pavement; if fire, many areas of exposed mineral soil, many woody plants consumed, most 3+ in. fuels charred and many consumed; fairly even distribution of duff and litter consumption)

Required.

Accuracy Standards - Good Judgment

Field 79 - Disturb - Disturbance History (up to three sets of six-character alphanumeric codes for Form 1; up to 10 sets of six-character alphanumeric codes for Form 3)

Enter the following codes to denote disturbance history of the plot or polygon in decreasing order of effect on present vegetation.

Disturbance type is entered as the first two characters; either the intensity or annual frequency of disturbance is entered as the third character; year of disturbance is entered as the fourth and fifth characters; and season of disturbance is entered as the sixth character.

DT = Disturbance Type (two-digit number)

Use the following codes to denote type of disturbance.

99 = Other Disturbance Type, explain in comments (Field 80)

01 = Clear Cut
02 = Shelterwood
03 = Seedtree
04 = Group Selection Cut
05 = Individual Selection Cut
60 = Blow Down
61 = Thinning
62 = Over Story Removal
22 = Other Timber Cut, explain in comments (Field 80)

06 = Broadcast Slash Burn - Planned Ignition
25 = Wildfire in Slash
07 = Jackpot Burn
08 = Dozer Pile and Burn
63 = Understory Burn
09 = Wildfire - natural fuels
10 = Prescribed Burn - Planned Ignition - Natural Fuels
24 = Prescribed Burn - Unplanned Ignition - Natural Fuels
69 = Yum Yarding

21 = Planting
11 = Shade Cards
12 = Herbicide Application
65 = Pesticide Application
66 = Fertilizer Application
67 = Fencing
19 = Grass Seeding
68 = Other Seeding, explain in comments (Field 80)
20 = Poison Baiting
13 = Skid Trail
14 = Heavy Equipment Disturbance

70 = Season Long Grazing System
71 = Deferred Rotation Grazing System
72 = Rest Rotation Grazing System
73 = Deferred Grazing System
74 = Holistic Management Grazing System
15 = Other Cattle Grazing System, explain in comments (Field 80)
16 = Other Domestic Sheep Grazing System, explain in comments (Field 80)

17 = Big Game
18 = Rodents
75 = Other Animal, explain in comments (Field 80)
31 = Spruce Budworm
32 = Mountain Pine Beetle
76 = Other Insect Disease, explain in comments (Field 80)
77 = Blister Rust
78 = Other Disease, explain in comments (Field 80)

40 = Mining Disturbance - Tailing Impoundment
41 = Mining Disturbance - Waste Dump
42 = Mining Disturbance - Open Pit or Cut
43 = Mining Disturbance - Other, explain in comments (Field 80)
50 = Mine Reclamation - Recontouring
51 = Mine Reclamation - Fertilization
52 = Mine Reclamation - Seeding
53 = Mine Reclamation - Topsoil Application
54 = Mine Reclamation - Ground Surface Scarification
55 = Mine Reclamation - Other, explain in comments (Field 80)

I = Intensity or Frequency of Disturbance (one-character alphanumeric code)

Enter one of the following codes to denote either the intensity or frequency of disturbance.

Use the following codes to denote intensity of disturbance.

N = Not Applicable
1 = Low
2 = Moderate
3 = High

Use the following codes to denote the frequency with which a particular grazing use, or other disturbance, occurs within the plot or polygon.

N = Not Applicable
A = Use, or disturbance, occurs every year.
B = Use, or disturbance, occurs once every 2 years.
C = Use, or disturbance, occurs once every 3 years.
D = Use, or disturbance, occurs once every 4 years.
E = Use, or disturbance, occurs once every 5 years.
F = Use, or disturbance, occurs once every 6 to 10 years.
G = Use, or disturbance, occurs once every 11 to 20 years.
H = Use, or disturbance, occurs once every 21 to 50 years.
I = Use, or disturbance, occurs once every 51 to 100 years.
J = Use, or disturbance, occurs once every 101 years or more.

YR = Year of Treatment (two-character alphanumeric code)

If the disturbance occurred during the 1900's, enter the last two characters of the year the disturbance occurred or as close an estimate as can be made. If the disturbance occurred in the 1800's, enter a P for the first character, then enter 1-9 for the nearest 10-year period. For instance, if the event happened in 1888, enter P 9 . For disturbances such as insect and disease, enter the date when evidence was first recorded. For a previous grazing system that has been changed, enter the year the previous system was started. For the present grazing system, enter the year it was started.

If you cannot make a reasonable guess for year of disturbance, then enter N A .

S = Season of Disturbance (one-character alphanumeric code)

Use the following codes to denote the season of disturbance.

N = Not Applicable

1 = Winter (plants are dormant due to freezing temperatures; usually occurs from November through March).

2 = Spring (plants are making new growth following winter dormancy; grasses and forbs are in vegetative to flowering stages and are not experiencing stress; conifer buds are open; usually occurs from April through June).

3 = Summer (herbaceous plants are curing out due to moisture and temperature stress; conifer buds harden off; usually occurs from July through August).

4 = Fall (herbaceous plants make some regrowth due to fall rains; forbs, shrubs and broadleaf trees start to turn color and become senescent due to freezing temperatures at night; usually occurs from September through October).

5 = Spring and Summer

6 = Spring and Fall

7 = Summer and Fall

8 = Fall and Winter

9 = Winter and Spring

A = Winter and Summer

B = Winter, Spring, and Summer

C = Spring, Summer, and Fall

D = Summer, Fall, and Winter

E = Fall, Winter, and Spring

F = During Growing Season - defined as active growth prior to dormancy

G = During Dormant Season - defined as period of no growth

Y = Year Long

Example: a moderate prescribed burn in a Douglas-fir/sagebrush type with planned ignition that was conducted in the spring of 1962 would be entered as - 1 0 2 6 2 2 .

Consult the Regional Office for additional codes.

Optional.

Accuracy Standards - Good Judgment

Field 80 - Comments (up to 60-alphanumeric characters for Form 1; up to 230-alphanumeric characters for Form 3)

The following is a partial listing of items which should be considered for entry into the comments field.

Include comments concerning location, key environmental features, vegetation relationships, history, and disturbance factors not identified in other fields.

Identify adjacent communities and indicate whether they occur on wetter or drier sites. Discuss why adjacent communities are different if they are on the same kind of site.

If the plot is in a community near water, determine the distance both vertically and horizontally from the average high water mark. For the vertical distance give it a negative sign (-) if it is below the mean high water mark and a positive (+) sign if it is above the mean high water mark.

4.5 - DATA COLLECTION PROCEDURES--PLANT SPECIES DATA FOR THE BASIC SAMPLING METHODS

4.51 - Recon Plant Species Data (Form 1)

Plant species data for the Recon Sampling Method are recorded after General Environmental Data on Form 1. Both types of data are entered into the same data base for analysis. Plant species are described by vegetation type within a stand or polygon in this method.

Keep track of the Key_ID fields recorded when sampling a stand or polygon to avoid duplication. Be sure to record the name or number of the quad map or aerial photograph the stands or polygons are located on. Such information is useful in tracking data sheets in the field and organizing them for data entry. There is room on the form for two vegetation type descriptions which are denoted by two different Key_ID's.

Individual plant species data are entered in Fields 2 to 5 of the Plant Species Data section of Form 1. Up to 12 plant species may be entered for a given plot. The first eight plant species entered are the dominant representatives of the different life forms (e.g., tree, shrub, graminoid, forb, and fern) present on the plot. A dominant plant species must have 5 percent or more foliar canopy cover. Plant species 9 to 12 are used to record data for other species on the plot which may be of importance to the purpose of data collection. For example, plant species 9 to 12 may be habitat type or succession indicator species in stand exam sampling. In soil survey, they may be species important for soil-vegetation correlation; for general wildlife habitat analysis, they may be important wildlife plant species; and for range analysis, they may be key indicator species of range condition or trend. If a plant species is listed as a dominant in species 1 to 8, do not repeat it in species 9 to 12.

Field 1 - No_Sp - Number of Plant Species (up to a two-digit number)

Enter the number of plant species recorded on the form.

Required.

Accuracy Standards - No Errors

Field 2 - L - Life Form (one-digit number)

For each species, enter its appropriate life form code from the list below.

Code	Life Form
1	tree (includes conifer and broadleaf trees)
2	shrub (includes woody stemmed vines & subshrubs)
3	graminoid
4	forb
5	fern/allies (includes Lycopodium and Selalginella)

Required.

Accuracy Standards - No Errors

Field 3 - Species - Plant Species Name (six-character alphanumeric code)

Enter the first three letters of the genus and the first three letters of the specific epithet in capital letters. Identify plants to species, if possible. Check in Appendix B for symbol notations to be used for plant species with duplicate six-letter codes. If identification can only be made to genus, enter the first six letters of the genus. If the genus name is less than six letters, use an "X" for the missing letters. If identification can only be made to life form, enter the appropriate life form code from Appendix B.

Dead trees are entered as separate species from their living counterparts. To denote a dead tree species, use the code DEAD followed by the appropriate two-letter species identifier in Appendix B. For example, a dead Douglas-fir would be coded DEADDF. Dead trees which cannot be identified to species are sampled collectively and denoted by the code DEADTR.

Required.

Accuracy Standards - No error in species level identification for dominant, common, or habitat type indicator plants. Other plants should be accurately identified to species if adequate floral and vegetative characteristics exist. Identification is made through use of an accepted plant taxonomy. The examiner should request verification of questionable plant identifications from a person locally recognized in their ability to identify plants.

Field 4 - C - Foliar Canopy Cover (one-character alphanumeric code)

Enter one of the following codes to denote foliar canopy cover class by plant species.

Code	Class Range	Midpoint
T	0.1< 1%	0.5%
P	1 < 5%	3.0%
1	5 < 15%	10.0%
2	15 < 25%	20.0%
3	25 < 35%	30.0%
4	35 < 45%	40.0%
5	45 < 55%	50.0%
6	55 < 65%	60.0%
7	65 < 75%	70.0%
8	75 < 85%	80.0%
9	85 < 95%	90.0%
F	95- 100%	97.5%

Required.

Accuracy Standards - ± 1 class

Field 5 - I - Largest Age, Size Class, Height, or Other Indicator Value (one-character alphanumeric code)

For each tree species, enter one of the following codes to denote the largest living size class which constitutes 10 percent or more relative cover for the species.

Life Form	Code	Age/Size Class
Coniferous Trees	1	= seedlings (< 4.5 ft. tall or < 1.0 in. d.b.h.)
	2	= saplings (≥ 4.5 ft. tall or 1.0 in. to 4.9 in. d.b.h.)
	3	= pole (5.0 in. to 8.9 in. d.b.h.)
	4	= mature (9.0 in. to 13.9 in. d.b.h.)
	5	= large mature (14.0+ in. d.b.h.)
Broadleaf Trees	1	= seedlings & sprouts (< 1 year old)
	2	= small saplings (≥ 1 year and < 6 ft. tall)
	3	= saplings (≥ 6 ft. tall and <4.9 in. d.b.h.)
	4	= pole & mature (4.9 in. to 13.9 in. d.b.h.)
	5	= large mature (14.0+ in. d.b.h.)

For example, if Douglas-fir had an absolute canopy cover of 50 percent and the relative canopy cover by size class was 5 percent mature, 60 percent pole, and 35 percent sapling, code 3 would be entered. If the mature size class made up 20 percent of the absolute canopy cover (i.e., 40 percent relative cover), code 4 would be entered.

For each shrub and herbaceous species, enter the average height of the upper layer of the species to the nearest foot. For species less than 6 inches, enter 0 . For species greater than 9.5 feet, enter T. If indicator values different than those presented are entered, keep a record of the codes used in the appropriate project file.

Required.

Accuracy Standards - Good Judgment

4.52 - Fastplot Plant Species Data (Form 2)

Plant species data for the Fastplot Sampling Method are recorded on Form 2. Such data may also be entered after general plot data on the shortened field sheet for forms 2 and 3 provided in Appendix C. Plant species data and general plot data are entered into separate data bases for analysis.

Keep track of Key_ID fields recorded when sampling macroplots to avoid duplication. Be sure to record the name or number of the quad map or aerial photograph the macroplots are located on. Such information is useful in tracking data sheets in the field and organizing them for data entry.

Individual plant species data are entered in Fields 3 to 6. Up to 12 plant species may be entered for a given plot. The first eight plant species entered are the dominant representatives of the different life forms (e.g., tree, shrub, graminoid, forb, and fern) present on the plot. A dominant plant species must have 5 percent or more foliar canopy cover. Plant species 9 to 12 are used to record data for other species on the plot which may be of importance to the purpose of data collection. For example, plant species 9 to 12 may be habitat type or succession indicator species in stand exam sampling. In soil survey, they may be species important to soil-vegetation correlation; for general wildlife habitat analysis, they may be important wildlife plant species; and for range analysis, they may be key indicator species of range condition or trend. If a plant species is listed as a dominant in species 1 to 8, do not repeat it in species 9 to 12.

Field 1 - KEY_ID (10-character alphanumeric code)

Enter the Key_ID identified in Field 1 of Form 3 (General Plot Data).

Required.

Accuracy Standards - No Errors

Field 2 - No_Sp - Number of Plant Species (up to a two-digit number)

Enter the number of plant species recorded on the form.

Required.

Accuracy Standards - No Errors

Field 3 - L - Life Form (one-digit number)

For each species, enter its appropriate life form code from the list below.

Code	Life Form
1	tree (includes conifer and broadleaf trees)
2	shrub (includes woody stemmed vines & subshrubs)
3	graminoid
4	forb
5	fern/allies (includes Lycopodium and Selalginella)

Required.

Accuracy Standards - No Errors

Field 4 - Species - Plant Species Name (six-character alphanumeric code)

Enter the first three letters of the genus and the first three letters of the specific epithet in capital letters. Identify plants to species, if possible. Check in Appendix B for symbol notations to be used for plant species with duplicate six-letter codes. If identification can only be made to genus, enter the first six letters of the genus. If the genus name is less than six letters, use an "X" for the missing letters. If identification can only be made to life form, enter the appropriate life form code from Appendix B.

Dead trees are entered as separate species from their living counterparts. To denote a dead tree species, use the code DEAD followed by the appropriate two-letter species identifier in Appendix B. For example, a dead Douglas-fir would be coded DEADDF. Dead trees which cannot be identified to species are sampled collectively and denoted by the code DEADTR.

Required.

Accuracy Standards - No error in species level identification for dominant, common, or habitat type indicator plants. Other plants should be accurately identified to species if adequate floral and vegetative characteristics exist. Identification is made through use of an accepted plant taxonomy. The examiner should request verification of questionable plant identifications from a person locally recognized in their ability to identify plants.

Field 5 - C - Foliar Canopy Cover (one-character alphanumeric code)

Enter one of the following codes to denote foliar canopy cover class by plant species.

Code	Class Range	Midpoint
T	0.1< 1%	0.5%
P	1 < 5%	3.0%
1	5 < 15%	10.0%
2	15 < 25%	20.0%
3	25 < 35%	30.0%
4	35 < 45%	40.0%
5	45 < 55%	50.0%
6	55 < 65%	60.0%
7	65 < 75%	70.0%
8	75 < 85%	80.0%
9	85 < 95%	90.0%
F	95- 100%	97.5%

Required.

Accuracy Standards - $\pm$ 1 class

Field 6 - I - Largest Age, Size Class, Height, or Other Indicator Value (one-character alphanumeric code)

For each tree species, enter one of the following codes to denote the largest living size class which constitutes 10 percent or more relative cover for the species.

Life Form	Code	Age/Size Class
Coniferous Trees	1	= seedlings (< 4.5 ft. tall or < 1.0 in. d.b.h.)
	2	= saplings (≥ 4.5 ft. tall or 1.0 in. to 4.9 in. d.b.h.)
	3	= pole (5.0 in. to 8.9 in. d.b.h.)
	4	= mature (9.0 in. to 13.9 in. d.b.h.)
	5	= large mature (14.0+ in. d.b.h.)
Broadleaf Trees	1	= seedlings & sprouts (< 1 year old)
	2	= small saplings (≥ 1 year and < 6 ft. tall)
	3	= saplings (≥ 6 ft. tall and <4.9 in. d.b.h.)
	4	= pole & mature (4.9 in. to 13.9 in. d.b.h.)
	5	= large mature (14.0+ in. d.b.h.)

For example, if Douglas-fir had an absolute canopy cover of 50 percent and the relative canopy cover by size class was 5 percent mature, 60 percent pole, and 35 percent sapling, code 3 would be entered. If the mature size class made up 20 percent of the absolute canopy cover (i.e., 40 percent relative cover), code 4 would be entered.

For each shrub and herbaceous species, enter the average height of the upper layer of the species to the nearest foot. For species less than 6 inches, enter 0 . For species greater than 9.5 feet, enter T. If indicator values different than those presented are entered, keep a record of the codes used in the appropriate project file.

Required.

Accuracy Standards - Good Judgment

4.53 - Ocular Plant Species Data (Form 4)

This form is used for recording plant species data when the Ocular Sampling Method is used. Fields 3 to 9 are used to record data by individual plant species. Plant species and general plot data are entered into separate data bases for analysis. The following is a description of Form 4 data fields.

Field 1 - KEY_ID (10-character alphanumeric code)

Enter the Key_ID identified in Field 1 of Form 3 (General Plot Data).

Required.

Accuracy Standards - No Errors

Field 2 - Number of Plant Species Recorded (up to a two-digit number)

Enter the number of plant species recorded on the form.

Number of species allowed - Only 45 species may be entered into the data base. If more than 45 species are encountered, delete those with low combinations of cover and frequency until 45 remain.

Required.

Accuracy Standards - No Errors

Field 3 - LF - Life Form (one-digit number)

For each species, enter its appropriate life form code from the list below.

Code	Life Form
1	tree (includes conifer and broadleaf trees)
2	shrub (includes woody stemmed vines & subshrubs)
3	graminoid
4	forb
5	fern/allies (includes Lycopodium and Selalginella)

Required.

Accuracy Standards - No Errors

Field 4 - NAME - Plant Species Name (six-character alphanumeric code)

Enter the first three letters of the genus and the first three letters of the specific epithet in capital letters. Identify plants to species, if possible. Check in Appendix B for symbol notations to be used for plant species with duplicate six-letter codes. If identification can only be made to genus, enter the first six letters of the genus. If the genus name is less than six letters, use an "X" for the missing letters. If identification can only be made to life form, enter the appropriate life form code from Appendix B.

Dead trees are entered as separate species from their living counterparts. To denote a dead tree species, use the code DEAD followed by the appropriate two-letter species identifier from Appendix B. For example, a dead Douglas-fir would be coded DEADDF. Dead trees which cannot be identified to species are sampled collectively and denoted by the code DEADTR.

Required.

Accuracy Standards - No error in species level identification for dominant, common, or habitat type indicator plants. Other plants should be accurately identified to species if adequate floral and vegetative characteristics exist. Identification is made through use of an accepted plant taxonomy. The examiner should request verification of questionable plant identifications from a person locally recognized in their ability to identify plants.

Field 5 - CC - Foliar Canopy Cover (one-character alphanumeric code)

Enter one of the following codes to denote foliar canopy cover class by plant species.

Code	Class Range	Midpoint
T	0.1< 1%	0.5%
P	1 < 5%	3.0%
1	5 < 15%	10.0%
2	15 < 25%	20.0%
3	25 < 35%	30.0%
4	35 < 45%	40.0%
5	45 < 55%	50.0%
6	55 < 65%	60.0%
7	65 < 75%	70.0%
8	75 < 85%	80.0%
9	85 < 95%	90.0%
F	95- 100%	97.5%

Required.

Accuracy Standards - $\pm$ 1 class

Field 6 - MHT - Mean Height (up to a three-digit number)

Estimate, by plant species, average upper layer height to the nearest foot. The following coding convention is used to denote average plant species height. For plant species less than 6 inches in height, enter a 0. For plant species between 6 and 18 inches in height, enter a 1, for 18 to 30 inches, enter a 2, etc.

Required.

Accuracy Standards - ± 10 percent

Field 7 - AGE/SIZE CLASS - Plant Species Age or Size Class (five one-character alphanumeric codes)

Enter, by plant species, the absolute foliar canopy cover class representative of each of its age or size class expressions. Absolute cover class estimates of dead foliage cover are entered directly for shrubs and herbs. To record dead tree cover, enter all dead trees as separate species, as discussed in Field 4. Cover class codes presented in Field 5 are used for all cover entries. Enter the number 0 to denote that a particular age/size class of a plant species is not represented on the plot. The age/size class cover values recorded for a particular plant species may total to greater than 100 percent because of overlap.

The following is a listing of age/size class grouping codes and descriptions arranged by life form:

Life Form	Code	Age/Size Class
Coniferous Trees	1	= seedlings (< 4.5 ft. tall or < 1.0 in. d.b.h.)
	2	= saplings (≥ 4.5 ft. tall or 1.0 in. to 4.9 in. d.b.h.)
	3	= pole (5.0 in. to 8.9 in. d.b.h.)
	4	= mature (9.0 in. to 13.9 in. d.b.h.)
	5	= large mature (14.0+ in. d.b.h.)
Broadleaf Trees	1	= seedlings & sprouts (< 1 year old)
	2	= small saplings (≥ 1 year and < 6 ft. tall)
	3	= saplings (≥ 6 ft. tall and <4.9 in. d.b.h.)
	4	= pole & mature (4.9 in. to 13.9 in. d.b.h.)
	5	= large mature (14.0+ in. d.b.h.)

Life Form	Code	Age/Size Class
Shrubs	1 =	seedlings and sprouts (< 1 year old)
	2 =	young (≥ 1 year and < 10 percent accumulated dead twigs and branches)
	3 =	mature (≥ 10 percent and < 30 percent accumulated dead twigs and branches)
	4 =	decadent (≥ 30 percent accumulated dead twigs and branches)
	5 =	dead
Graminoids & Forbs	1 =	seedlings and sprouts (< 1 year old)
	2 =	young (≥ 1 year without accumulated litter)
	3 =	mature (accumulated litter present and < 50 percent dead basal veg.)
	4 =	decadent (≥ 50 percent dead basal veg.)
	5 =	dead

Optional.

Accuracy Standards - ± 1 class

Field 8

This field consists of three different one-digit numeric codes which are recorded by plant species. Entries must be made for all three codes provided, if this field is recorded.

DI - Distribution Class (one-digit number)

Look at the distribution of individual plants in the plot. Select one of the following codes to denote a particular plant species distribution within the plot.

0	Distribution class not recorded
1	Individuals are randomly distributed or dispersed.
2	Individuals have a clumped distribution.
3	Individuals have a regular distribution.
4	Individuals are grouped into colonies that are randomly or regularly distributed.
5	Not enough individuals to determine their pattern of distribution.

Optional.

Accuracy Standards - Good Judgment

SF - Shrub Form Class (one-digit number)

For shrub species, select one of the following codes:

0 Shrub form class not recorded.
1 Little or no hedging, indicating light use in the past 3 or 4 years. Growth tends to be linear.
2 Moderately hedged. Use within the past 3 or 4 years has created much development of lateral branching and a more complex growth.
3 Heavily or closely hedged. Heavy use in the past 3 or 4 years has created a pronounced "broomed" or "clubbed" appearance.

Optional.

Accuracy Standards - Good Judgment

PH - Phenology Class (one-digit number)

Record the average phenology of the plant species using the following codes:

0 phenology class not recorded

Coniferous trees

1 pre-bud break
2 post-bud break
3 cones developed

Shrubs and Broadleaf Trees

1 less than 3/4 leaf development without flowers
2 3/4 to full leaf without flowers
3 flowering with leaves developed
4 seeds developed with leaves developed
5 fruits developed with leaves developed
6 senescent leaves
7 flowers developed prior to 3/4 leaf development
8 no floral development this year, full vegetative growth

Forbs

1 less than 3/4 leaf development without flowers
2 3/4 to full leaf without flowers
3 flowering with leaves developed

Forbs (continued)

4	seeds developed with leaves developed
6	senescent leaves
8	no floral development this year, full vegetative growth

Graminoids

1	leaves partially developed, no heads
2	inflorescence inside the sheath (in the boot)
3	inflorescence partially exerted from the sheath
4	inflorescence fully exerted from the sheath
5	seed heads dispersed
6	senescent leaves
8	no seed head this year, full vegetative growth

Optional.

Accuracy Standards - Good Judgment

Field 9

This field consists of two different one-character alphanumeric codes which are recorded by plant species. Entries must be made for both of the codes provided, if this field is recorded.

UT - Utilization Class (one-character alphanumeric code)

Estimate percent utilization based on the volume of current year's growth removed by herbivores. For those species which display utilization, enter one of the following class codes to denote the percent utilization present. If utilization class if not recorded, enter the number 0.

Code	Class Range	Midpoint
T	0.1< 1%	0.5%
P	1 < 5%	3.0%
1	5 < 15%	10.0%
2	15 < 25%	20.0%
3	25 < 35%	30.0%
4	35 < 45%	40.0%
5	45 < 55%	50.0%
6	55 < 65%	60.0%
7	65 < 75%	70.0%
8	75 < 85%	80.0%
9	85 < 95%	90.0%
F	95- 100%	97.5%

Optional.

Accuracy Standards - ± 1 class

IN - Indicator Class (one-character alphanumeric code)

This code is used to indicate special characteristics of different plant species. Codes utilized are specific to a given study and should be noted in the appropriate project file. If indicator class is not recorded, enter the number 0.

Optional.

4.54 - Cover Microplot Plant Species Data (Form 5)

The Cover Microplot Plant Species Data Form is used in conjunction with Form 3 (General Plot Data) and Form C (Optional Plant Species Attribute Data) to record data for the Cover Microplot Sampling Method. Fields 8 to 12 are completed for each plant species. The attributes recorded are:

Field 1 - KEY_ID (10-character alphanumeric code)

Enter the KEY_ID identified in Field 1 of Form 3 (General Plot Data).

Required.

Accuracy Standards - No Errors

Field 2 - Plot Size (one-digit number)

Enter one of the following codes to denote the microplot size being used:

1 = Microplot frame type A (10 in. x 20 in.).
2 = Microplot frame type B (20 in. x 20 in.).

Required.

Accuracy Standards - No Errors

Field 3 - No of Transects - Number of Transects (one-digit number)

Enter the number of transects being recorded. This number will usually be five, but cannot exceed seven.

Required.

Accuracy Standards - No Errors

Field 4 - No of Microplots - Number of Microplots (up to a two-digit number)

Enter the number of microplots sampled per transect. Five microplots are usually recorded per transect in this method; however, up to 10 microplots may be sampled per transect dependent on study needs.

Required.

Accuracy Standards - No Errors

Field 5 - No Species - Number of Plant Species (up to a two-digit number)

Enter the total number of plant species recorded within the microplots used to sample the macroplot.

Number of species allowed - Only 45 species may be entered into the data base. If more than 45 species are encountered, delete those with low combinations of cover and frequency until 45 remain.

Required.

Accuracy Standards - No Errors

Transect Number (one-digit number)

Enter a number between one and seven to denote the belt transect being recorded. Transects are numbered from left to right along the baseline. This value is not entered into the data base, since data entry is structured by transect number.

Required.

Accuracy Standards - No Errors

GROUND COVER - Point Sample Estimates of Ground Cover by Selected Categories (one-digit number per category per microplot)

For each microplot, record ground cover at eight points on the plot frame. These points are sampled along the inside of two sides of the microplot at 5, 10, 15, and 20-inch intervals. Enter the number of points that encounter bare soil, gravel, rock, moss, litter/duff, basal vegetation, wood, or other ground cover parameter not denoted on the form (e.g., lichen). If the other ground cover category is used, be sure to denote what type of variable is being recorded in the comments section of Form 3 (General Plot Data).

Individual point counts by microplot are not entered into the data base. They are summed by transect and entered in Field 6.

Required.

Accuracy Standards - No Error

Field 6 - SUM - Microplot Ground Cover (up to a two-digit number per category per transect)

Sum the total number of ground cover points sampled along a transect by ground cover category. Each microplot used in the summary will have a total of eight points.

Required.

Accuracy Standards - No Errors

Repeat this sequence for the remaining transects.

PRODUCTION - Green Weight Estimates of Above Ground Biomass by Life Form (up to a four-digit number per life form per microplot)

For each microplot use a bag, gram scale and clippers to weigh units of green foliage by life form (graminoid, forb and shrub). Estimate the grams green weight, by life form, for the whole microplot. All foliage that hangs over the microplot is included in such estimates. For microplot frame type A, this is all of the green foliage within the 10 x 20-inch microplot. For microplot frame type B, this is all the green foliage within the 20 x 20-inch microplot. Shrub foliage above 7-foot height is not included in production estimates.

Individual microplot production data are not entered into the data base. They are summed by transect and entered in Field 7.

Optional.

Accuracy Standards - ± 10 percent

SUM GW - **Summed Green Weight Estimates by Life Form (up to a four-digit number per life form per transect)**

Enter the total grams of green weight recorded within the microplots by life form and transect. These data are not entered into the data base for analysis. They are used to compute total dry weights (Field 7).

Optional.

Accuracy Standard - ± 10 percent

DWF - **Dry Weight Factor (two-digit number per life form per transect)**

Enter an appropriate dry weight factor to convert summed microplot green weight estimates of a life form along a transect (SUM GW) to total dry weight. Dry weight factors are provided by life form in Section 4.42 after Field 67.

Optional.

Accuracy Standard - Good Judgment

Field 7 - **TOTAL DW - Total Dry Weight Production by Life Form Class (up to a four-digit number per life form per transect)**

Enter the total measured dry weight production (in grams) of a given life form by transect. Dry weight is obtained by multiplying the life form's summed microplot green weight (SUM GW) by an appropriate dry weight factor (DWF).

Life form dry weights by transect are entered in the data base for analysis.

Optional.

Accuracy Standards - ± 10 percent

Repeat this sequence for the remaining transects.

The following fields are recorded by plant species.

Field 8 - LF - Life Form (one-digit number)

For each plant species, enter its appropriate life form code from the list below.

Code	Life Form
1	tree (includes conifer and broadleaf trees)
2	shrub (includes woody stemmed vines & subshrubs)
3	graminoid
4	forb
5	fern/allies (includes Lycopodium and Selalginella)

Required.

Accuracy Standards - No Errors

Field 9 - NAME - Plant Species Name (six-character alphanumeric code)

Enter the first three letters of the genus and the first three letters of the specific epithet in capital letters. Identify plants to species, if possible. Check in Appendix B for symbol notations to be used for plant species with duplicate six-letter codes. If identification can only be made to genus, enter the first six letters of the genus. If the genus name is less than six letters, use an "X" for the missing letters. If identification can only be made to life form, enter the appropriate life form code from Appendix B.

Dead trees are entered as separate species from their living counterparts. To denote a dead tree species, use the code DEAD followed by the appropriate two-letter species identifier from Appendix B. For example, a dead Douglas-fir would be coded DEADDF. Dead trees which cannot be identified to species are sampled collectively and denoted by the code DEADTR.

Required.

Accuracy Standards - No error in species level identification for dominant, common, or habitat type indicator plants. Other plants should be accurately identified to species if adequate floral and vegetative characteristics exist. Identification is made through use of an accepted plant taxonomy. The examiner should request verification of questionable plant identifications from a person locally recognized in their ability to identify plants.

C - Foliar Canopy Cover Class Data (one-character alphanumeric code per species per microplot)

For each plant species in the microplot, estimate its foliar canopy cover within the microplot and enter one of the following codes to denote that value.

Code	Class Range	Midpoint
T	0.1< 1%	0.5%
P	1 < 5%	3.0%
1	5 < 15%	10.0%
2	15 < 25%	20.0%
3	25 < 35%	30.0%
4	35 < 45%	40.0%
5	45 < 55%	50.0%
6	55 < 65%	60.0%
7	65 < 75%	70.0%
8	75 < 85%	80.0%
9	85 < 95%	90.0%
F	95- 100%	97.5%

Individual microplot cover data for plant species are not entered in the data base. They are summarized by transect and entered in Field 11.

Required.

Accuracy Standards - $\pm$ 1 class

Field 10 - N - Number of Microplots the Plant Species Occurred In (one-character alphanumeric code per species per transect)

Count the number of microplots, by transect, the plant species was present in (i.e., its frequency). For one through nine occurrences, enter 1 through 9. For 10 occurrences, enter F.

Required.

Accuracy Standards - No Errors

SUM FCC - Plant Species Summed Foliar Canopy Cover (up to a three-digit number per species per transect)

Use this space to calculate a given plant species summed foliar canopy cover by transect. This is accomplished by adding the mid-point foliar canopy cover class values recorded over the microplots sampled. This value is not entered in the data base.

Required.

Accuracy Standard - No Errors

Field 11 - ACC - Average Plant Species Foliar Canopy Cover (up to a two-digit number per species per transect)

For each plant species, divide its summed foliar canopy cover within a transect (SUM FCC) by the number of microplots sampled per transect. This number is rounded off to the nearest percent, and entered into the data base.

Microplot cover values are not calculated, in analysis software, for plant species which are also characterized by the Line Intercept Canopy Cover Sampling Method (Section 4.24a).

Required.

Accuracy Standards - ± 10 percent

Repeat this sequence for the remaining transects.

Field 12 - MHT - Mean Height (up to a three-digit number)

Estimate, by plant species, average upper layer height to the nearest foot. The following coding convention is used to denote average plant species height. For plant species less than 6 inches in height, enter a 0. For plant species between 6 and 18 inches in height enter a 1, for 18 to 30 inches, enter a 2, etc.

Mean height of a plant species on a macroplot is entered only once in the data base. Consequently, it should be recorded on the first transect form that a species appears on.

Required.

Accuracy Standards - ± 10 percent

4.55 - Nested Microplot Plant Species Data (Form 6)

The Nested Microplot Plant Species Data Form is used in conjunction with Form 3 (General Plot Data) and Form C (Optional Plant Species Attributes Data) to record data for the Nested Microplot Sampling Method. Fields 8 to 13 are completed for each plant species present within the macroplot. The following data are recorded:

Field 1 - KEY_ID (10-character alphanumeric code)

Enter the Key_ID identified in Field 1 of Form 3 (General Plot Data).

Required.

Accuracy Standards - No Errors

Field 2 - Plot Size (one-digit number)

Enter one of the following codes to denote the microplot size being used:

1 = Microplot frame type A (10 in. x 20 in.).
2 = Microplot frame type B (20 in. x 20 in.).

Required.

Accuracy Standards - No Errors

Field 3 - No of Transects - Number of Transects (one-digit number)

Enter the number of transects being recorded. This number will usually be five, but cannot exceed seven.

Required.

Accuracy Standards - No Errors

Field 4 - No of Microplots - Number of Microplots (up to a two-digit number)

Enter the number of microplots sampled per transect. Five microplots are usually sampled per transect in this method; however, up to 10 microplots may be sampled per transect dependent on study needs.

Required.

Accuracy Standards - No Errors

Field 5 - No Species - Number of Plant Species (up to a two-digit number)

Enter the total number of plant species recorded within the microplots used to sample the macroplot.

Number of species allowed - Only 45 species may be entered into the data base. If more than 45 species are encountered, delete those with low combinations of cover and frequency until 45 remain.

Required.

Accuracy Standards - No Errors

Transect No - Transect Number (one-digit number)

Enter a number between one and seven to denote the belt transect being recorded. Transects are numbered from left to right along the baseline. This value is not entered into the data base, since data entry is structured by transect number.

Required.

Accuracy Standards - No Errors

GROUND COVER - Point Sample Estimates of Ground Cover by Selected Categories (one-digit number per category per microplot)

For each microplot, record ground cover at eight points on the plot frame. These points are sampled along the inside of two sides of the microplot at 5, 10, 15, and 20-inch intervals. Enter the number of points that encounter bare soil, gravel, rock, moss, litter/duff, basal vegetation, wood, or other ground cover parameter not denoted on the form (e.g., lichen). If the other

ground cover category is used, be sure to denote what type of variable is being recorded in the comments section of Form 3 (General Plot Data).

Individual point counts by microplot are not entered into the data base. They are summed by transect and entered in Field 6.

Required.

Accuracy Standards - No Error

Field 6 - SUM - Microplot Ground Cover (up to a two-digit number per category per transect)

Sum the total number of ground cover points sampled along a transect by ground cover category. Each microplot used in the summary will have a total of eight points.

Required.

Accuracy Standards - No Errors

Repeat this sequence for the remaining transects.

PRODUCTION - Green Weight Estimates of Above Ground Biomass by Life Form (up to a four-digit number per life form per microplot)

For each microplot use a bag, gram scale and clippers to weigh units of green foliage by life form (graminoid, forb and shrub). Estimate the grams green weight, by life form, for the whole microplot. All foliage that hangs over the microplot is included in such estimates. For microplot frame type A, this is all of the green foliage within the 10 x 20-inch microplot. For microplot frame type B, this is all the green foliage within the 20 x 20-inch microplot. Shrub foliage above 7-foot height is not included in production estimates.

Individual microplot production data are not entered into the data base. They are summed by transect and entered in Field 7.

Optional.

Accuracy Standards - $\pm$ 10 percent

SUM GW - Summed Green Weight Estimates by Life Form (up to a four-digit number per life form per transect)

Enter the total grams of green weight recorded within the microplots by life form and transect. These data are not entered into the data base for analysis. They are used to compute total dry weights (Field 7).

Optional.

Accuracy Standard - ± 10 percent

DWF - Dry Weight Factor (two-digit number per life form per transect)

Enter an appropriate dry weight factor to convert summed microplot green weight estimates of a life form along a transect (SUM GW) to total dry weight. Dry weight factors are provided by life form in Section 4.42 after Field 67.

Optional.

Accuracy Standard - Good Judgment

Field 7 - TOTAL DW - Total Dry Weight Production by Life Form Class (up to a four-digit number per life form per transect)

Enter the total measured dry weight production (in grams) of a given life form by transect. Dry weight is obtained by multiplying the life form's summed microplot green weight (SUM GW) by an appropriate dry weight factor (DWF).

Life form dry weights by transect are entered in the data base for analysis.

Optional.

Accuracy Standards - ± 10 percent

Repeat this sequence for the remaining transects.

The following fields are recorded by plant species.

Field 8 - LF - Life Form (one-digit number)

For each plant species, enter its appropriate life form code from the list below.

Code	Life Form
1	tree (includes conifer and broadleaf trees)
2	shrub (includes woody stemmed vines & subshrubs)
3	graminoid
4	forb
5	fern/allies (includes Lycopodium and Selalginella)

Required.

Accuracy Standards - No Errors

Field 9 - NAME - Plant Species Name (six-character alphanumeric code)

Enter the first three letters of the genus and the first three letters of the specific epithet in capital letters. Identify plants to species, if possible. Check in Appendix B for symbol notations to be used for plant species with duplicate six-letter codes. If identification can only be made to genus, enter the first six letters of the genus. If the genus name is less than six letters, use an "X" for the missing letters. If identification can only be made to life form, enter the appropriate life form code from Appendix B.

Dead trees are entered as separate species from their living counterparts. To denote a dead tree species, use the code DEAD followed by the appropriate two-letter species identifier from Appendix B. For example, a dead Douglas-fir would be coded DEADDF. Dead trees which cannot be identified to species are sampled collectively and denoted by the code DEADTR.

Required.

Accuracy Standards - No error in species level identification for dominant, common, or habitat type indicator plants. Other plants should be accurately identified to species if adequate floral and vegetative characteristics exist. Identification is made through use of an accepted plant taxonomy. The examiner should request verification of questionable plant identifications from a person locally recognized in their ability to identify plants.

F - Nested Rooted Frequency (one-digit number per species per microplot)

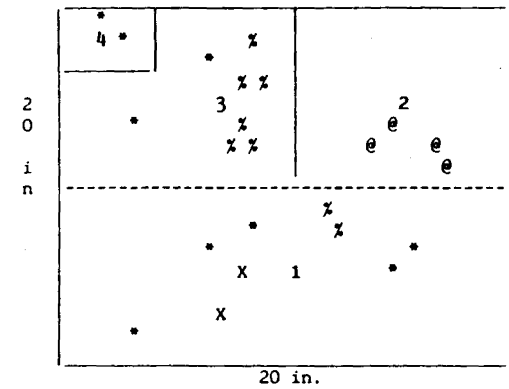
Nested rooted frequency is recorded, by plant species, in each microplot using the following procedure:

> Record the smallest size subplot each plant species of the microplot is rooted in. Start with subplot 4. If the basal portion of a plant species is rooted in that subplot, record a 4 for the species. Go to subplot 3 and record a 3 for all plant species rooted in that subplot which were not previously recorded in subplot 4. Continue this same procedure for subplot 2, if microplot frame type A is being used, and for subplots 2 and 1 if microplot frame type B is used (Appendix G). An example of plant species nested rooted frequency values within a microplot is provided in Figure 6.

Individual microplot rooted frequency values are not entered in the data base. They are summed by transect for a given plant species and entered in Field 10.

Required.

Accuracy Standards - No Errors



Species Symbol	Nested Rooted Frequency Value for the Species
*	4
%	3
@	2
X	1

Figure 6. Example of nested rooted frequency values for plant species in microplot frame type B. The bold print numbers displayed denote subplot type.

C - Foliar Canopy Cover Class Data (one-character alphanumeric code per species per microplot)

For each plant species in the microplot, estimate its foliar canopy cover within the microplot and enter one of the following codes to denote that value.

Code	Class Range	Midpoint
T	0.1< 1%	0.5%
P	1 < 5%	3.0%

Code	Class Range	Midpoint
1	5 < 15%	10.0%
2	15 < 25%	20.0%
3	25 < 35%	30.0%
4	35 < 45%	40.0%
5	45 < 55%	50.0%
6	55 < 65%	60.0%
7	65 < 75%	70.0%
8	75 < 85%	80.0%
9	85 < 95%	90.0%
F	95- 100%	97.5%

Individual microplot plant species canopy cover estimates are not entered in the data base. They are summarized by transect and entered in Field 11.

Required.

Accuracy Standards - ± 1 class

Field 10 - SRF - Sum of Nested Rooted Frequency (up to a two-digit number per plant species per transect)

Enter the sum of nested rooted frequency values, within a transect, by plant species. This value is calculated by adding the subplot numbers recorded for a given plant species over all microplots sampled within a transect. The maximum value for a plant species on a transect occurs when all the microplots have the species in the smallest subplot (i.e., summed value = 4 x number of microplots sampled).

Required.

Accuracy Standards - No Errors

SUM FCC - Plant Species Summed Foliar Canopy Cover (up to a three-digit number per species per transect)

Use this space to calculate a given plant species summed foliar canopy cover by transect. This is accomplished by adding the mid-point foliar canopy cover class values recorded over the microplots sampled. This value is not entered in the data base.

Field 11 - ACC - Average Plant Species Foliar Canopy Cover (up to a two-digit number per species per transect)

For each plant species, divide its summed foliar canopy cover within a transect (SUM FCC) by the number of microplots sampled per transect. This number is rounded off to the nearest percent and entered in the data base.

Microplot cover values are not calculated, in analysis software, for plant species which are also characterized by the Line Intercept Canopy Cover Sampling Method (Section 4.24a).

Required.

Accuracy Standards - ± 10 percent

Field 12 - N - Number of Microplots the Plant Species Occurred In (one-character alphanumeric code per species per transect)

Count the number of microplots, by transect, the plant species was present in (i.e., its frequency). For one through nine occurrences, enter 1 through 9. For 10 occurrences, enter F.

Required.

Accuracy Standards - No Errors

Repeat this sequence for the remaining transects.

Field 13 - MHT - Mean Height (up to a three-digit number)

Estimate, by plant species, average upper layer height to the nearest foot. The following coding convention is used to denote average plant species height. For plant species less than 6 inches in height, enter a 0. For plant species between 6 and 18 inches in height enter a 1, for 18 to 30 inches, enter a 2, etc.

Mean height of a plant species on a macroplot is entered only once in the data base. Consequently, it should be recorded on the first transect form that a species appears on.

Required.

Accuracy Standards - ± 10 percent

4.6 - DATA COLLECTION PROCEDURES--OPTIONAL SAMPLING METHODS

The Optional Sampling Methods are described in Section 4.24. They may be used to supplement data obtained from the Basic Sampling Methods discussed in Sections 4.23 and 4.5.

4.61 - Line Intercept Canopy Cover Data (Form 7)

This sampling method is primarily used to record shrub species foliar canopy cover. It provides a more quantitative measurement of shrub cover than ocular estimation. Cover assessments of a particular plant species obtained by this sampling method take precedence over ocular estimates in ECODATA analysis programs.

Field 1 - KEY_ID (10-character alphanumeric code)

Enter the KEY_ID Code identified in Field 1 of Forms 1 or 3 (Recon Data or General Plot Data)

Required.

Accuracy Standards - No Errors

Field 2 - Transect Length (up to a three-digit number)

Enter the transect length in feet. A 66-foot transect is usually used to sample a 1/10-acre rectangular macroplot.

Required.

Accuracy Standards - No Errors

Field 3 - No of Transects - Number of Transects (one-digit number)

Enter a number between one and seven to denote the total number of transects sampled within the plot.

Required.

Accuracy Standards - No Errors

Field 4 - No of Species - Total Number of Plant Species (up to a two-digit number)

Enter the total number of plant species recorded on the form.

A maximum of 18 species may be recorded at a plot in this method.

Required.

Accuracy Standards - No Errors

The following data are collected by plant species.

Field 5 - SPECIES - Plant Species Name (six-character alphanumeric code)

Enter the first three letters of the genus and the first three letters of the specific epithet in capital letters. Identify plants to species, if possible. Check in Appendix B for symbol notations to be used for plant species with duplicate six-letter codes. If identification can only be made to genus, enter the first six letters of the genus. If the genus name is less than six letters, use an "X" for the missing letters. If identification can only be made to life form, enter the appropriate life form code from Appendix B.

Required.

Accuracy Standards - No error in species level identification for dominant, common, or habitat type indicator plants. Other plants should be accurately identified to species if adequate floral and vegetative characteristics exist. Identification is made through use of an accepted plant taxonomy. The examiner should request verification of questionable plant identifications from a person locally recognized in their ability to identify plants.

Field 6 - Cover Data by Transect (up to a three-digit number per species per transect)

Enter the sum of live canopy cover, in inches, intercepted above and below the transect line by plant species. Gaps within the live foliar canopy of a species are not included in cover assessments. Totals of intercept are recorded by plant species and belt transect for data processing. The total recorded cannot exceed the length of the transect and does not count overlap of the same species.

Required.

Accuracy Standards - $\pm$ 12 inches

Field 7 - LF - Life Form (one-digit number)

For each species, enter its appropriate life form code from the list below.

Code	Life Form
1	tree (includes conifer and broadleaf trees)
2	shrub (includes woody stemmed vines and subshrubs)
3	graminoid
4	forb
5	fern/allies (includes Lycopodium and Selalginella)

Required, if life forms other than shrubs are being recorded.

Accuracy Standards - No Errors

Field 8 - MHT - Mean Height (up to a three-digit number)

Estimate, by plant species, average upper layer height to the nearest foot. The following coding convention is used to denote average plant species height. For plant species less than 6 inches in height, enter a 0. For plant species between 6 and 18 inches in height enter a 1, for 18 to 30 inches, enter a 2, etc.

Mean height of a plant species on a plot is entered only once in the data base. Consequently, it should be recorded on the first transect form that a species appears on.

Required if not previously recorded on another ECODATA sampling form.

Accuracy Standards - ± 10 percent

Complete the remaining fields for each additional plant species following the instructions specified in Fields 5 to 8.

4.62 - Density Data (Form 8)

The Density Data Sampling Method is used to record the number of occurrences of an item in a specified area (i.e., its density). Density may be recorded by plant species, age or size class of a plant species, or by other item (e.g., cow pie). Sampling of a plot is usually performed within replicated transects of rectangular shape. Provisions are made, however, for replicated sampling of circular microplots in this method.

Field 1 - KEY_ID (10-character alphanumeric code)

Enter the KEY_ID code identified in Field 1 of Forms 1 or 3 (Recon Data or General Plot Data).

Required.

Accuracy Standards - No Errors

Field 2 - Transect Length (up to a three-digit number)

Enter transect length, in feet, if a rectangular transect shape is sampled within the plot. Only one transect length is used at a given plot. Width of the transect (Field 7) may be adjusted to facilitate improved density sampling of different items at a plot. If only microplots of circular shape are sampled within the plot, enter "000".

Required.

Accuracy Standards - No Errors

Field 3 - No of Transects - Number of Transects or Microplots Sampled (one-digit number)

Enter a number between one and seven to denote the total number of transects or circular microplots sampled. If both transects and circular microplots are used at a plot the number of each is always the same. For example, only one circular microplot may be sampled for tree species density along a transect which is sampled for gopher mound density.

Required.

Accuracy Standards - No Errors

Field 4 - No of Items - Number of Items (up to a two-digit number)

Enter the number of different items sampled.

The maximum number of items which may be sampled at a plot is 45.

Required.

Accuracy Standards - No Errors

Field 5 - ITEM NAME/AGE - Name of Item and its Age or Size Class Code (six-character alphanumeric code to denote the items name followed by a one-digit number to denote its age or size class)

ITEM NAME

If a plant species is being recorded, enter the first three letters of the genus and the first three letters of the specific epithet in capital letters. Identify plants to species, if possible. Check in Appendix B for symbol notations to be used for plant species with duplicate six-letter codes. If identification can only be made to genus, enter the first six letters of the genus. If the genus name is less than six letters, use an "X" for the missing letters. If identification can only be made to life form, enter the appropriate life form code from Appendix B.

Dead trees are entered as separate species from their living counterparts. To denote a dead tree species, use the code DEAD followed by the appropriate two-letter species identifier from Appendix B. For example, a dead Douglas-fir would be coded DEADDF. Dead trees which cannot be identified to species are sampled collectively and denoted by the code DEADTR.

If an item besides a plant species is sampled, enter a unique six-digit capitalized alphanumeric code to represent that item (see special codes, Appendix B). Use the following alpha codes, if appropriate:

Code	Item	Code	Item
GOPMOU	Gopher Mound	COWPIE	Cattle dropping
GOPCAS	Gopher Cast	SHEPIE	Domestic sheep
BEAPIE	Bear dropping	ELKPIE	Elk dropping
DEEPIE	Deer dropping	MOOPIE	Moose dropping

Coordinate with the Regional Office for development of additional item codes.

Required.

Accuracy Standards - No Errors

AGE - Age or Size Class Codes

The following codes may be used to denote the age or size class of an item in density sampling. An age or size class code is entered after the six-character name of an item.

Life Form	Code	Age/Size Class
Coniferous Trees	1 =	seedlings (< 4.5 ft. tall or < 1.0 in. d.b.h.)
	2 =	saplings (≥ 4.5 ft. tall or 1.0 in. to 4.9 in. d.b.h.)
	3 =	pole (5.0 in. to 8.9 in. d.b.h.)
	4 =	mature (9.0 in. to 13.9 in. d.b.h.)
	5 =	large mature (14.0+ in. d.b.h.)
Broadleaf Trees	1 =	seedlings & sprouts (< 1 year old)
	2 =	small saplings (≥ 1 year and < 6 ft. tall)
	3 =	saplings (≥ 6 ft. tall and <4.9 in. d.b.h.)
	4 =	pole & mature (4.9 in. to 13.9 in. d.b.h.)
	5 =	large mature (14.0+ in. d.b.h.)
Shrubs	1 =	seedlings and sprouts (< 1 year old)
	2 =	young (≥ 1 year and < 10 percent accumulated dead twigs and branches)
	3 =	mature (≥ 10 percent and < 30 percent accumulated dead twigs and branches)
	4 =	decadent (≥ 30 percent accumulated dead twigs and branches)
	5 =	dead
Graminoids & Forbs	1 =	seedlings and sprouts (< 1 year old)
	2 =	young (≥ 1 year without accumulated litter)
	3 =	mature (accumulated litter present and < 50 percent dead basal veg.)
	4 =	decadent (≥ 50 percent dead basal veg.)
	5 =	dead

Other classes may be substituted for age or size class, such as categories for structure and hardness of snags or downed logs. Such classes will be specific to a given study and should be recorded in the appropriate project file.

Optional. Leave the seventh character of this Field blank if the age or size class of an item is not important to sampling objectives.

Accuracy Standard - No Errors

Field 6 - TS - Transect Shape Code (one-digit number per item)

Enter "1" if a rectangular shaped transect is used to sample a given item and "2" if a circular microplot is used.

Required.

Accuracy Standard - No Errors.

Field 7 - WIDTH - Transect Width or Circular Microplot Radius (up to a three-digit number)

Enter transect width, in inches, if sampling a rectangular shaped transect. Enter microplot radius, in inches, if sampling a circular microplot.

Required.

Accuracy Standard - No Errors

Field 8 - DENSITY DATA BY TRANSECT - Transect or Circular Microplot Item Counts (up to a three-digit number per item per transect or microplot)

Enter the total number of each item within each transect or microplot. Additional space is provided on the form to record box tallies of item occurrences within a transect or microplot.

Required.

Accuracy Standard - Good Judgment

4.63 - Production Data (Form 9)

The Production Sampling Method is used to collect production data for selected plant species, genera, or life forms. It may be used in conjunction with any of the Basic Sampling Methods (Section 4.23). Microplots of any shape may be used to sample production in this method if their dimensions can be expressed in units of square feet.

Field 1 - KEY_ID (10-character alphanumeric code)

Enter the Key_ID identified in Field 1 of Forms 1 or 3 (Recon Data or General Plot Data).

Required.

Accuracy Standards - No Errors

Field 2 - Number of Plots (up to a two-digit number)

Enter the number of production microplots sampled. **A maximum of 20 microplots may be sampled within a plot.**

Required.

Accuracy Standards - No Errors

Field 3 - Plots/Transect - Number of Microplots Sampled per Transect (up to a two-digit number)

If the sampling design used required placement of production microplots along established transects within the plot, enter the number of microplots sampled per transect. The number of microplots sampled is the same for all transects.

Required if transects are used in the sampling design.

Accuracy Standards - No Errors

Field 4 - Plot Size (up to a three-digit number)

Enter the production microplot size used in square feet, to the nearest 0.1-square foot. Only one microplot size may be used to sample a given plot. Production microplots may be either rectangular or circular in shape dependent on study needs.

Required.

Accuracy Standards - No Errors

Field 5 - No of Items - Number of Items Sampled (up to a two-digit number)

Enter the total number of plant species, genus, and life form groups sampled (i.e., the total number of items recorded in Field 6). **A maximum of 12 items may be sampled at a given plot.**

Required.

Accuracy Standards - No Errors

Field 6 - ITEM - Plant Species, Genus, or Life Form Name (six-character alphanumeric code)

If sampling by plant species is performed, enter the first three letters of the genus and the first three letters of the specific epithet in capital letters. Identify plants to species, if possible. Check in Appendix B for symbol notations to be used for plant species with duplicate six-letter codes. If identification is only made to genus, enter the first six letters of the genus.

If the genus name is less than six letters, use an "X" for the missing letters. If sampling by life form is performed, enter the appropriate life form code from Appendix B.

Required.

Accuracy Standards - No error in species level identification for dominant, common, or habitat type indicator plants. Other plants should be accurately identified to species if adequate floral and vegetative characteristics exist. Identification is made through use of an accepted plant taxonomy. The examiner should request verification of questionable plant identifications from a person locally recognized in their ability to identify plants.

The following fields are used to record microplot production data by plant species, genus, or life form.

If transects are used in sampling, enter microplots in consecutive order by transect. For example, if 25 microplots were sampled along five transects, the first five microplots entered would be from transect one, the next five microplots entered would be from transect two, etc.

GW - Microplot Green Weight Estimates of Above Ground Biomass by Item (up to a four-digit number per item per microplot)

For each microplot use a bag, gram scale and clippers to weigh units of green foliage by item. Estimate the grams green weight, by item, for the whole microplot. All foliage that hangs over the microplot is included in such estimates. Shrub foliage above 7-foot height is not included in production estimates.

Individual microplot green weight production data are not entered into the data base. They are converted to dry weight values and entered in Field 7 (DW).

Optional.

Accuracy Standard - ± 10 percent

DWF - Dry Weight Factor (two-digit number per item per microplot)

Enter an appropriate dry weight factor to convert microplot green weight estimates (GW) to dry weight by item. Dry weight factors are provided by life form in Section 4.42 after Field 67. If the same dry weight factor is used for an item over all the microplots sampled, enter it once in the space provided for the first microplot.

Optional.

Accuracy Standard - Good Judgment

Field 7 - DW - Microplot Dry Weight Production by Item (up to a four-digit number per item per microplot)

Enter the total measured dry weight production (in grams) of a given item by microplot. Dry weight is obtained by multiplying the item's microplot green weight (GW) by an appropriate dry weight factor (DWF).

Microplot dry weight production data, by item, are entered in the data base for analysis.

Required.

Accuracy Standards - ± 10 percent

4.64 - Short Nested Microplot Plant Species Data (Form A)

The Short Nested Microplot Plant Species Data Form is used in conjunction with Form 3 (General Plot Data) and Form 4 (Ocular Plant Species Data) to monitor change over time in a few select plant species at a macroplot. Data collected are the same as for the Nested Microplot Sampling Method; however, fewer plant species are sampled in this method (i.e., 12 or less).

Field 1 - KEY_ID (10-character alphanumeric code)

Enter the Key_ID identified in Field 1 of Form 3 (General Plot Data).

Required.

Accuracy Standards - No Errors

Field 2 - Plot Size (one-digit number)

Enter one of the following codes to denote the microplot size being used:

1 = Microplot frame type A (10 in. x 20 in.).
2 = Microplot frame type B (20 in. x 20 in.).

Required.

Accuracy Standards - No Errors

Field 3 - No of Transects - Number of Transects (one-digit number)

Enter the number of transects being recorded. This number will usually be five, but cannot exceed seven.

Required.

Accuracy Standards - No Errors

Field 4 - No of Microplots - Number of Microplots (up to a two-digit number)

Enter the number of microplots sampled per transect. Five microplots are usually sampled per transect in this method; however, up to 10 microplots may be sampled per transect dependent on study needs.

Required.

Accuracy Standards - No Errors

Field 5 - No Species - Number of Plant Species (up to a two-digit number)

Enter the total number of plant species recorded within the microplots used to sample the macroplot.

Number of species allowed - Only 12 species may be entered into the data base. If more than 12 species need to be sampled to meet study objectives use the Nested Microplot Sampling Method.

Required.

Accuracy Standards - No Errors

Transect No - Transect Number (one-digit number)

Enter a number between one and seven to denote the transect being recorded. Transects are numbered from left to right along the baseline. This value is not entered into the data base, since data entry is structured by transect number.

Required.

Accuracy Standards - No Errors

GROUND COVER - Point Sample Estimates of Ground Cover by Selected Categories (one-digit number per category per microplot)

For each microplot, record ground cover at eight points on the plot frame. These points are sampled along the inside of two sides of the microplot at 5, 10, 15, and 20-inch intervals. Enter the number of points that encounter bare soil, gravel, rock, moss, litter/duff, basal vegetation, wood, or other ground cover parameter not denoted on the form (e.g., lichen). If the other ground cover category is used, be sure to denote what type of variable is being recorded in the comments section of Form 3 (General Plot Data).

Individual point counts by microplot are not entered into the data base. They are summed by transect and entered in Field 6.

Required.

Accuracy Standards - No Error

Field 6 - SUM - Microplot Ground Cover (up to a two-digit number per category per transect)

Sum the total number of ground cover points sampled along a transect by ground cover category. Each microplot used in the summary will have a total of eight points.

Required.

Accuracy Standards - No Errors

Repeat this sequence for the remaining transects.

PRODUCTION - Green Weight Estimates of Above Ground Biomass by Life Form (up to a four-digit number per life form per microplot)

For each microplot use a bag, gram scale and clippers to weigh units of green foliage by life form (graminoid, forb and shrub). Estimate the grams green weight, by life form, for the whole microplot. All foliage that hangs over the microplot is included in such estimates. For microplot frame type A, this is all of the green foliage within the 10 x 20-inch microplot. For microplot frame type B, this is all the green foliage within the 20 x 20-inch microplot. Shrub foliage above 7-foot height is not included in production estimates.

Individual microplot production data are not entered into the data base. They are summed by transect and entered in Field 7.

Optional.

Accuracy Standards - ± 10 percent

SUM GW - Summed Green Weight Estimates by Life Form (up to a four-digit number per life form per transect)

Enter the total grams of green weight recorded within the microplots by life form and transect. These data are not entered into the data base for analysis. They are used to compute total dry weights (Field 7).

Optional.

Accuracy Standard - ± 10 percent

DWF - Dry Weight Factor (two-digit number per life form per transect)

Enter an appropriate dry weight factor to convert summed microplot green weight estimates of a life form along a transect (SUM GW) to total dry weight. Dry weight factors are provided by life form in Section 4.42 after Field 67.

Optional.

Accuracy Standard - Good Judgment

Field 7 - TOTAL DW - Total Dry Weight Production by Life Form Class (up to a four-digit number per life form per transect)

Enter the total measured dry weight production (in grams) of a given life form by transect. Dry weight is obtained by multiplying the life form's summed microplot green weight (SUM GW) by an appropriate dry weight factor (DWF).

Life form dry weights by transect are entered in the data base for analysis.

Optional.

Accuracy Standards - ± 10 percent

Repeat this sequence for the remaining transects.

The following fields are recorded by plant species.

Field 8 - LF - Life Form (one-digit number)

For each plant species sampled, enter its appropriate life form code from the list below.

Code	Life Form
1	tree (includes conifer and broadleaf trees)
2	shrub (includes woody stemmed vines & subshrubs)
3	graminoid
4	forb
5	fern/allies (includes Lycopodium and Selalginella)

Required.

Accuracy Standards - No Errors

Field 9 - NAME - Plant Species Name (six-character alphanumeric code)

Enter the first three letters of the genus and the first three letters of the specific epithet in capital letters. Identify plants to species, if possible. Check in Appendix B for symbol notations to be used for plant species with duplicate six-letter codes. If identification can only be made to genus, enter the

first six letters of the genus. If the genus name is less than six letters, use an "X" for the missing letters. If identification can only be made to life form, enter the appropriate life form code from Appendix B.

Dead trees are entered as separate species from their living counterparts. To denote a dead tree species, use the code DEAD followed by the appropriate two-letter species identifier from Appendix B. For example, a dead Douglas-fir would be coded DEADDF. Dead trees which cannot be identified to species are sampled collectively and denoted by the code DEADTR.

Required.

Accuracy Standards - No error in species level identification for dominant, common, or habitat type indicator plants. Other plants should be accurately identified to species if adequate floral and vegetative characteristics exist. Identification is made through use of an accepted plant taxonomy. The examiner should request verification of questionable plant identifications from a person locally recognized in their ability to identify plants.

F - Nested Rooted Frequency (one-digit number per species per microplot)

Nested rooted frequency is recorded, by plant species, in each microplot using the following procedure:

> Record the smallest size subplot each sampled plant species of the microplot is rooted in. Start with subplot 4. If the basal portion of a plant species is rooted in that subplot, record a 4 for the species. Go to subplot 3 and record a 3 for all plant species rooted in that subplot which were not previously recorded in subplot 4. Continue this same procedure for subplot 2, if microplot frame type A is being used, and for subplots 2 and 1 if microplot frame type B is used (Appendix G). An example of plant species nested rooted frequency values within a microplot is provided in Figure 6.

Individual microplot rooted frequency values are not entered in the data base. They are summed by transect, for a given plant species, and entered in Field 10.

Required.

Accuracy Standards - No Errors

C - Foliar Canopy Cover Class Data (one-character alphanumeric code per species per microplot)

For each plant species sampled, estimate its foliar canopy cover within the microplot and enter one of the following codes to denote that value.

Code	Class Range	Midpoint
T	0.1< 1%	0.5%
P	1 < 5%	3.0%
1	5 < 15%	10.0%
2	15 < 25%	20.0%
3	25 < 35%	30.0%
4	35 < 45%	40.0%
5	45 < 55%	50.0%
6	55 < 65%	60.0%
7	65 < 75%	70.0%
8	75 < 85%	80.0%
9	85 < 95%	90.0%
F	95- 100%	97.5%

Individual microplot plant species canopy cover estimates are not entered in the data base. They are summarized by transect and entered in Field 11.

Required.

Accuracy Standards - $\pm$ 1 class

Field 10 - SRF - Sum of Nested Rooted Frequency (up to a two-digit number per plant species per transect)

Enter the sum of nested rooted frequency values, within a transect, by plant species. This value is calculated by adding the subplot numbers recorded for a given plant species over all microplots sampled within a transect. The maximum value for a plant species on a transect occurs when all the microplots have the species in the smallest subplot (i.e., summed value = 4 x number of microplots sampled).

Required.

Accuracy Standards - No Errors

SUM FCC - Plant Species Summed Foliar Canopy Cover (up to a three digit number per species per transect)

Use this space to calculate a given plant species summed foliar canopy cover by transect. This is accomplished by adding the mid-point foliar canopy cover class values recorded over the microplots sampled. This value is not entered in the data base.

Field 11 - ACC - Average Plant Species Foliar Canopy Cover (up to a two-digit number per species per transect)

For each plant species sampled, divide its summed foliar canopy cover within a transect (SUM FCC) by the number of microplots sampled per transect. This number is rounded off to the nearest percent, and entered in the data base.

Microplot cover values are not calculated, in analysis software, for plant species which are also characterized by the Line Intercept Canopy Cover Sampling Methods (Section 4.24a).

Required.

Accuracy Standards - ± 10 percent

Field 12 - N - Number of Microplots the Plant Species Occurred In (one-character alphanumeric code per species per transect)

Count the number of microplots, by transect, the plant species was present in (i.e., its frequency). For one through nine occurrences, enter 1 through 9. For 10 occurrences, enter F.

Required.

Accuracy Standards - No Errors

Repeat this sequence for the remaining transects.

Field 13 - MHT - Mean Height (up to a three-digit number)

Estimate, by plant species, average upper layer height to the nearest foot. The following coding convention is used to denote average plant species height. For plant species less than 6 inches in height, enter a 0. For plant species between 6 and 18 inches in height enter a 1, for 18 to 30 inches, enter a 2, etc.

Mean height of a plant species on a macroplot is entered only once in the data base. Consequently, it should be recorded on the first transect form that a species appears on.

Required.

Accuracy Standards - ± 10 percent

4.65 - Point Cover Data (Form B)

The Point Cover Sampling Method is used to record point estimates of cover by plant species, ground cover variable, and other important items. Sampling of a plot is usually performed via systematically located points along randomly placed transects.

Field 1 - KEY_ID (10-character alphanumeric code)

Enter the KEY_ID code identified in Field 1 of Forms 1 or 3 (Recon Data or General Plot Data).

Required.

Accuracy Standards - No Errors

Field 2 - Transect Length (up to a three-digit number)

Enter the transect length used in feet.

Required.

Accuracy Standards - No Errors

Field 3 - No of Transects - Number of Transects Sampled (one-digit number)

Enter a number between one and seven to denote the total number of transects sampled.

Required.

Accuracy Standards - No Errors

Field 4 - No of Items - Number of Items (up to a two-digit number)

Enter the number of different items sampled.

The maximum number of items which may be sampled at a plot is 45.

Required.

Accuracy Standards - No Errors

Field 5 - ITEM - Name of Item (six-character alphanumeric code)

If a plant species is being recorded, enter the first three letters of the genus and the first three letters of the specific epithet in capital letters. Identify plants to species, if possible. Check in Appendix B for symbol notations to be used for plant species with duplicate six-letter codes. If identification can only be made to genus, enter the first six letters of the genus. If the genus name is less than six letters, use an "X" for the missing letters. If identification can only be made to life form, enter the appropriate life form code from Appendix B.

Dead trees are entered as separate species from their living counterparts. To denote a dead tree species, use the code DEAD followed by the appropriate two-letter species identifier from Appendix B. For example, a dead Douglas-fir would be coded DEADDF. Dead trees which cannot be identified to species are sampled collectively and denoted by the code DEADTR.

If an item besides a plant species is sampled, enter a unique six-digit capitalized alphanumeric code from the special code section of Appendix B. Coordinate with the Regional Office for development of additional item codes.

Required.

Accuracy Standards - No Errors

Field 6 - TNP/T - Total Number of Points per Transect (up to a three-digit number)

Enter the total number of points sampled along a transect. This value is the same for all transects within a plot.

Required.

Accuracy Standard - No Errors

Field 7 - POINT COVER DATA BY TRANSECT - Number of Item Counts by Transect (up to a three-digit number per item per transect)

Enter the total number of point cover "hits" for each item by transect. Additional space is provided on the form to record box tallies of item point cover "hits" within a transect.

Required.

Accuracy Standard - Good Judgment

4.66 - Optional Plant Species Attribute Data (Form C)

This form is used for recording optional plant species attribute data when a Basic Sampling Method other than the Ocular Sampling Method is employed in sampling.

Field 1 - KEY_ID (10-character alphanumeric code)

Enter the Key_ID identified in Field 1 of Forms 1 or 3 (Recon Data or General Plot Data).

Required.

Accuracy Standards - No Errors

Field 2 - Number of Plant Species Recorded (up to a two-digit number)

Enter the number of plant species sampled on the form.

Number of species allowed--Only 20 species may be entered into the data base.

Required.

Accuracy Standards - No Errors

Field 3 - LF - Life Form (one-digit number)

For each species, enter its appropriate life form code from the list below.

Code	Life Form
1	tree (includes conifer and broadleaf trees)
2	shrub (includes woody stemmed vines & subshrubs)
3	graminoid
4	forb
5	fern/allies (includes Lycopodium and Selalginella)

Required.

Accuracy Standards - No Errors

Field 4 - NAME - Plant Species Name (six-character alphanumeric code)

Enter the first three letters of the genus and the first three letters of the specific epithet in capital letters. Identify plants to species, if possible. Check in Appendix B for symbol notations to be used for plant species with duplicate six-letter codes. If identification can only be made to genus, enter the first six letters of the genus. If the genus name is less than six letters, use an "X" for the missing letters. If identification can only be made to life form, enter the appropriate life form code from Appendix B.

Dead trees are entered as separate species from their living counterparts. To denote a dead tree species, use the code DEAD followed by the appropriate two-letter species identifier in Appendix B. For example, a dead Douglas-fir would be coded DEADDF. Dead trees which cannot be identified to species are sampled collectively and denoted by the code DEADTR.

Required.

Accuracy Standards - No error in species level identification for dominant, common, or habitat type indicator plants. Other plants should be accurately identified to species if adequate floral and vegetative characteristics exist. Identification is made through use of an accepted plant taxonomy. The examiner should request verification of questionable plant identifications from a person locally recognized in their ability to identify plants.

Field 5 - AGE/SIZE CLASS - Plant Species Age or Size Class (five one-character alphanumeric codes)

Enter, by plant species, the absolute foliar canopy cover class representative of each of its age or size class expressions. Enter the number 0 to denote that a particular age/size class of a plant

species is not represented on the plot. The age/size class cover values recorded for a particular plant species may total to greater than 100 percent because of overlap. Absolute cover class estimates of dead foliage cover are entered directly for shrubs and herbs. To record dead tree cover, enter all dead trees as separate species as discussed in Field 4.

The following is a listing of foliar canopy cover class values to be used in data entry:

Code	Class Range	Midpoint
T	0.1< 1%	0.5%
P	1 < 5%	3.0%
1	5 < 15%	10.0%
2	15 < 25%	20.0%
3	25 < 35%	30.0%
4	35 < 45%	40.0%
5	45 < 55%	50.0%
6	55 < 65%	60.0%
7	65 < 75%	70.0%
8	75 < 85%	80.0%
9	85 < 95%	90.0%
F	95- 100%	97.5%

The following is a listing of age/size class grouping codes and descriptions arranged by life form.

Life Form	Code	Age/Size Class
Coniferous Trees	1	= seedlings (< 4.5 ft. tall or < 1.0 in. d.b.h.)
	2	= saplings (≥ 4.5 ft. tall or 1.0 in. to 4.9 in. d.b.h.)
	3	= pole (5.0 in. to 8.9 in. d.b.h.)
	4	= mature (9.0 in. to 13.9 in. d.b.h.)
	5	= large mature (14.0+ in. d.b.h.)
Broadleaf Trees	1	= seedlings & sprouts (< 1 year old)
	2	= small saplings (≥ 1 year and < 6 ft. tall)
	3	= saplings (≥ 6 ft. tall and <4.9 in. d.b.h.)
	4	= pole & mature (4.9 in. to 13.9 in. d.b.h.)
	5	= large mature (14.0+ in. d.b.h.)

Shrubs	1 = seedlings and sprouts (< 1 year old) 2 = young (≥ 1 year and < 10 percent accumulated dead twigs and branches) 3 = mature (≥ 10 percent and < 30 percent accumulated dead twigs and branches) 4 = decadent (≥ 30 percent accumulated dead twigs and branches) 5 = dead
Graminoids & Forbs	1 = seedlings and sprouts (< 1 year old) 2 = young (≥ 1 year without accumulated litter) 3 = mature (accumulated litter present and < 50 percent dead basal veg.) 4 = decadent (≥ 50 percent dead basal veg.) 5 = dead

Optional.

Accuracy Standards - ± 1 class

Field 6

This field consists of three different one-digit numeric codes which are recorded by plant species. Entries must be made for all three codes provided, if this field is recorded.

DI - Distribution Class (one-digit number)

Look at the distribution of individual plants in the plot. Select one of the following codes to denote a particular plant species distribution within the plot.

0	Distribution class not recorded.
1	Individuals are randomly distributed or dispersed.
2	Individuals have a clumped distribution.
3	Individuals have a regular distribution.
4	Individuals are grouped into colonies that are randomly or regularly distributed.
5	Not enough individuals to determine their pattern of distribution.

Optional.

Accuracy Standards - Good Judgment

SF - Shrub Form Class (one-digit number)

For shrub species, select one of the following codes:

0 Shrub form class not recorded.
1 Little or no hedging, indicating light use in the past 3 or 4 years. Growth tends to be linear.
2 Moderately hedged. Use within the past 3 or 4 years has created much development of lateral branching and a more complex growth.
3 Heavily or closely hedged. Heavy use in the past 3 or 4 years has created a pronounced "broomed" or "clubbed" appearance.

Optional.

Accuracy Standards - Good Judgment

PH - Phenology Class (one-digit number)

Record the average phenology of the plant species using the following codes:

0 phenology class not recorded

Coniferous trees

1 pre-bud break
2 post-bud break
3 cones developed

Shrubs and Broadleaf Trees

1 less than 3/4 leaf development without flowers
2 3/4 to full leaf without flowers
3 flowering with leaves developed
4 seeds developed with leaves developed
5 fruits developed with leaves developed
6 senescent leaves
7 flowers developed prior to 3/4 leaf development
8 no floral development this year, full vegetative growth

Forbs

1	less than 3/4 leaf development without flowers
2	3/4 to full leaf without flowers
3	flowering with leaves developed
4	seeds developed with leaves developed
6	senescent leaves
8	no floral development this year, full vegetative growth

Graminoids

1	leaves partially developed, no heads
2	inflorescence inside the sheath (in the boot)
3	inflorescence partially exerted from the sheath
4	inflorescence fully exerted from the sheath
5	seed heads dispersed
6	senescent leaves
8	no seed head this year, full vegetative growth

Optional.

Accuracy Standards - Good Judgment

Field 7

This field consists of two different one-character alphanumeric codes which are recorded by plant species. Entries must be made for both of the codes provided, if this field is recorded.

UT - Utilization Class (one-character alphanumeric code)

Estimate percent utilization based on the volume of current year's growth removed by herbivores. For those species which display utilization, enter one of the following class codes to denote the percent utilization present. If utilization class is not recorded, enter the number 0.

Code	Class Range	Midpoint
T	0.1< 1%	0.5%
P	1 < 5%	3.0%
1	5 < 15%	10.0%
2	15 < 25%	20.0%
3	25 < 35%	30.0%
4	35 < 45%	40.0%
5	45 < 55%	50.0%
6	55 < 65%	60.0%
7	65 < 75%	70.0%

Code	Class Range	Midpoint
8	75 < 85%	80.0%
9	85 < 95%	90.0%
F	95- 100%	97.5%

Optional.

Accuracy Standards - ± 1 class

IN - Indicator Class (one-character alphanumeric code)

This code is used to indicate special characteristics of different plant species. Codes utilized are specific to a given study and should be noted in the appropriate project file. If indicator class is not recorded, enter the number 0.

Optional.

ECOSYSTEM CLASSIFICATION HANDBOOK

APPENDIX A

LISTING OF ECOSYSTEM TYPE AND HABITAT TYPE CODES

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Ecotype and Habitat Type Codes

Appendix A presents a comprehensive listing of ecosystem types, habitat types and community types identified within the Northern Region (Region 1) of the USDA, Forest Service. Codes to be used in denoting ecosystem types are presented below.

A - Aquatic
B - Nonvegetated terrestrial
C - Coniferous forest
D - Juniper
E - Tree dominated wetland or woodland
F - Shrub dominated wetland
H - Herbaceous dominated wetland
J - Shrub dominated alpine
K - Forb dominated alpine
L - Graminoid dominated alpine
M - Shrubland
N - Grassland

Some of the plant species names found in the various classifications have been updated. These are:

Clematis occidentalis to Clematis columbiana	Girard (1985)
Clematis pseudoalpina to Clematis columbiana	Pfister and others (1977)
Poa sandbergii to Poa secunda	
Rhus trilobata to Rhus aromatica	Mueggler and Stewart (1985)
Salix phylicifolia to Salix planifolia	Pierce (1986)

A key to ecosystem types, references, and coding conventions to be used in denoting habitat and community types are presented in the following materials.

Ecosystem Type Key for Ecosystems with Vascular Plant Dominated Potential Communities

1. Ecosystem is an aquatic type with free water supporting no visible vascular plants or is dominated by floating vascular plants.
--Aquatic Ecosystem Type (A)

1. Ecosystem is not an aquatic type. --2

2. Ecosystem has the potential to support < 10 percent canopy cover of rooted vascular plants.
--Nonvegetated Terrestrial Ecosystem Type (B)

2. Ecosystem has the potential to support ≥ 10 percent canopy cover of rooted vascular plants. --3

3. Ecosystem has the potential to support ≥ 10 percent canopy cover of coniferous trees, excluding pure stands of juniper.
--Coniferous Forest Ecosystem Type (C)

3. Ecosystem has the potential to support < 10 percent canopy cover of coniferous trees or supports pure stands of juniper. --4

4. Ecosystem is located above the timberline (i.e., Alpine Community).

4a. Ecosystem has the potential to support ≥ 25 percent relative canopy cover of shrub species.
--Shrub Dominated Alpine Ecosystem Type (J)

4b. Ecosystem has the potential to support ≥ 25 percent relative canopy cover of forb species.
--Forb Dominated Alpine Ecosystem Type (K)

4c. Ecosystem has the potential to support ≥ 25 percent relative canopy cover of graminoid species.
--Graminoid Dominated Alpine Ecosystem Type (L)

4. Ecosystem is not an alpine community. --5

5. Ecosystem supports plants which are adapted to seasonally high water tables.

5a. Ecosystem has the potential to support ≥ 25 percent canopy cover of tree species.
--Tree Dominated Wetland Ecosystem Type (E)

5b. Ecosystem has the potential to support ≥ 25 percent canopy cover of shrub species.
--Shrub Dominated Wetland Ecosystem Type (F)

5c. Ecosystem has the potential to support ≥ 10 percent canopy cover of herbaceous species.
--Herbaceous Dominated Wetland Ecosystem Type (H)

5. Ecosystem is not a wetland community. --6

6. Ecosystem has the potential to support ≥ 25 percent canopy cover of JUNSCO or JUNOCC.
--Juniper Ecosystem Type (D)

6. Ecosystem has the potential to support < 25 percent canopy cover of JUNSCO or JUNOCC. --7

7. Ecosystem has the potential to support ≥ 25 percent canopy cover of deciduous trees.
--Woodland Ecosystem Type (E)

7. Ecosystem has the potential to support < 25 percent canopy cover of deciduous trees. --8

8. Ecosystem has the potential to support ≥ 15 percent canopy cover of shrub species.
--Shrubland Ecosytem Type (M)

8. Ecosystem has the potential to support < 15 percent canopy cover of shrub species. --9

9. Ecosystem has the potential to support ≥ 10 percent canopy cover of herbaceous species.
--Grassland Ecosystem Type (N)

References Cited

Anderson, N. L. 1973. The vegetation of rangeland sites associated with some grasshopper studies in Montana. Montana Agriculture Exp. Sta., Bull. No. 668. Montana State University, Bozeman, MT. **REFERENCE CODE = 19.**

Bamberg, S. A. 1961. Plant ecology of alpine tundra areas in Montana and adjacent Wyoming. M.S. Thesis, University of Colorado, Boulder, CO. 163 pp. **REFERENCE CODE = 27.**

Bamberg, S. A. and J. Major. 1968. Ecology of the vegetation and soils association with calcareous parent materials in three alpine regions of Montana. Ecological Monograph. 38:127-167. **REFERENCE CODE = 13.**

Cooper, S. V. 1975. Forest habitat types of northwestern Wyoming and contiguous portions of Montana and Idaho. Ph.D. Dissertation. Washington State University, Pullman, WA. 190 pp. **REFERENCE CODE = 16.**

Cooper, S., K. Neiman; and R. Steele. 1985. Forest habitat types of Northern Idaho. Editorial Draft; February 1985. USDA, Forest Service, Intermountain Forest and Range Exp. Sta., and Region 1, Missoula, MT. **REFERENCE CODE = 1.**

Culwell, L. D. and K. L. Scow. 1982. Vegetation monitoring and reference area evaluation, North King Mining Unit, Rosebud Co., Montana, 1981. Unpub. Tech. Rep. for Montco by Westech, Helena, MT. 45 pp. + Appendix. **REFERENCE CODE = 29.**

Culwell, L. D. and K. L. Scow. 1981. Vegetation inventory of the Youngs Creek study area, Big Horn County, Montana, 1980, Tech. Rep. for Shell Oil Company by Westech, Helena, MT. 7 pp. + 156 pp. + Appendix. **REFERENCE CODE = 17.**

Culwell, L. D., K. L. Scow, and L. Larsen. 1986. Reference area and reclamation monitoring, Peabody Coal Co., Big Sky Mine Area A. Rosebud Co., MT. 1985. Report prepared by Peabody Coal Co. **REFERENCE CODE = 20.**

Daubenmire, R. 1970. Steppe vegetation of Washington. Washington Agricultural Experiment Station Technical Bulletin 62. Washington Agricultural Exp. Sta., College of Agriculture, Washington State University, Pullman, WA. 131 p. **REFERENCE CODE = 2.**

Dusek, G. L. 1980. An inventory of vegetation, wildlife, and recreation resources of the Long Pines, Montana. Final Report. Montana Dept. of Fish, Wildlife and Parks, Ecological Services Division, Helena, MT. 158 pp. **REFERENCE CODE = 22.**

Econ, Inc. 1979. Western Energy Co. vegetation report for mining area D, 1977-1978. Project 206-83-A. 56 pp. **REFERENCE CODE = 24.**

Girard, M. M. 1985. Native woodland ecology and habitat type classification of southwestern North Dakota. Ph.D Thesis. North Dakota State University, Fargo, ND. 314 p. **REFERENCE CODE = 3.**

Hall, F. C. 1973. Plant communities of the Blue Mountains in eastern Oregon and southwestern Washington. R6 Area Guide 3-1. USDA, Forest Service, Pacific Northwest Region, Portland, OR. 62 p. **REFERENCE CODE = 4.**

Hansen, P. L. 1986. Riparian dominance types in: riparian vegetation work session, June 3-4, 1986. Unpublished Proceedings. **REFERENCE CODE = 28.**

Hansen, P. L., G. R. Hoffman, and A. J. Bjugstad. 1984. The vegetation of Theodore Roosevelt National Park, North Dakota: A habitat type classification. General Technical Report RM-113. USDA, Forest Service, Rocky Mountain Forest and Range Exp. Sta., Fort Collins, CO. 35 p. **REFERENCE CODE = 5.**

Hansen, P. L., and G. R. Hoffman. 1985. An ecological study of the vegetation of the Grand River/Cedar River, Sioux and Ashland Districts of the Custer National Forest: A habitat type classification. USDA, Forest Service, Cooperative Agreement No. RM-80-131-CA. Department of Biology, University of South Dakota, Vermillion, SD. 249 p. **REFERENCE CODE = 6.**

Hirsch, K. J. 1985. Habitat type classification of grasslands and shrublands of southwestern North Dakota. Ph.D Thesis. May 1985. North Dakota State University, Fargo, ND. 288 p. **REFERENCE CODE = 7.**

Johnson, P. and C. Youmans. 1983. Western Energy Co. vegetation report for mining area C. 1982. Proj. No. 295-83-A. Econ Inc. **REFERENCE CODE = 30.**

Johnson, P., and W. D. Billings. 1962. The alpine vegetation of the Beartooth Plateau in relation to cryopedogenic processes and patterns. Ecological Monograph. 32: 105-135 **REFERENCE CODE = 8.**

McAllister, D. C. 1981. CX Ranch project: vegetation inventory. Unpublished report prepared by Olsen-Elliot and Assoc., Helena, MT. 283 pp: **REFERENCE CODE = 18.**

Moseley, R. Not Dated. Synecological relationships of alpine spike-fescue (Leccopora kingii (Wats.) Weber) grasslands in east-central Idaho, U.S.D.A. Unpublished report in Prep For Arctic & Alpine Research. **REFERENCE CODE = 23.**

Mueggler, W. F. and W. L. Stewart. 1980. Grassland and shrubland habitat types of western Montana. USDA, Forest Service Gen. Tech. Rep. INT-66. Intermountain Forest and Range Exp. Sta., Ogden, UT. 154 p. **REFERENCE CODE = 9.**

Pfister, R. D., B. L. Kovalchick, S. F. Arno, and R. C. Presby. 1977. Forest habitat types of Montana. USDA, Forest Service Gen. Tech. Rep. INT-34, Intermountain Forest and Range Exp. Sta., Ogden, UT. 174 p. **REFERENCE CODE = 10.**

Pierce, J. 1986. Wetland community type classification for west-central Montana. Ecology Staff Grp. USDA, Forest Service, Northern Region, Missoula, MT. 158 p. **REFERENCE CODE = 11.**

Roberts, D. W. 1980. Forest habitat types of the Bear's Paw Mountains and Little Rocky Mountains, Montana. MS Thesis. University of Montana, Missoula, MT. 116 p. REFERENCE CODE = 12.

Roberts, D. W., and J. T. Sibbernsen, 1979. Forest & woodland habitat types of north-central MT. Vol 2: the Missouri River Breaks. School of Forestry, University of Montana. IFRES for BLM, State Land Office, Research Division, Billings, MT. YA-512-CT6-84. REFERENCE CODE= 31.

Servheen, C. and L. C. Lee. 1979. Mission Mountain grizzly bear studies, an interim report, 1976-78. Border Grizzly Project, Montana Forest and Conserv. Exp. Sta., University of Montana, School of Forestry, Missoula, MT. 299 pp. REFERENCE CODE = 25.

Thilenius, J. F., and D. R. Smith. 1985. Vegetation and soils of an alpine range in the Absoroka Mountains, Wyoming. USDA, Forest Service, Gen. Tech. Rep. RM-121, 18 p. Rocky Mountain Forest and Range Exp. Stat., Fort Collins, CO. REFERENCE CODE = 14.

Tisch, E. L. 1961. Seasonal food habits of the black bear in the Whitefish Range of north-western Montana. M.S. Thesis, University of Montana, Missoula, MT. 108 pp. REFERENCE CODE = 32.

Tisdale, E. W. 1979. A preliminary classification of Snake River Canyon grasslands in Idaho. University of Idaho, Forest, Wildlife and Range Exp. Sta. Station Note NO. 32. University of Idaho, Moscow, ID. 4 p. REFERENCE CODE = 15.

VTN Environmental Consultants. 1977. Vegetation, Spring Creek project. Unpubl. Tech. Rep. Prepared for Northern Energy Resources Co. 47 pp. + 111 pp. Appendix. REFERENCE CODE = 21.

Weaver, T. and D. Dale. 1974. Pinus albicaulis in central Montana: environment, vegetation and production. Amer. Medl. Nat. 92:222-230. REFERENCE CODE = 26.

References listed by order of citation code

1. Cooper, S., K. Neiman; and R. Steele. 1985
2. Daubenmire, R. 1970
3. Girard, M. M. 1985
4. Hall, F. C. 1973
5. Hansen, P. L., G. R. Hoffman, and A. J. Bjugstad. 1984
6. Hansen, P. L., G. R. Hoffman. 1985
7. Hirsch, K. J. 1985
8. Johnson, P., and W. D. Billings. 1962
9. Mueggler, W. F. and W. L. Stewart. 1980

10. Pfister, R. D., B. L. Kovalchick, S. F. Arno, and R. C. Presby. 1977
11. Pierce, J. 1986
12. Roberts, D. W. 1980
13. Bamberg, S. A., and J. Major. 1968
14. Thilenius, J. F., and D. R. Smith. 1985
15. Tisdale, E. W. 1979
16. Cooper, S. V. 1975
17. Culwell, L. D. and K. L. Scow. 1981
18. MaAllister, D. C. 1981
19. Anderson, N. L. 1973
20. Culwell, L. D., K. L. Scow, and L. Larsen. 1986
21. VTN Environmental Consultants. 1977
22. Dusek, G. L. 1980
23. Moseley, R. Not Dated
24. Econ, Inc. 1979
25. Servheen, C. and L. C. Lee. 1979
26. Weaver, T. and D. Dale. 1974
27. Bamberg, S. A. 1961
28. Hansen, P. L. 1986
29. Culwell, L. D. and K. L. Scow. 27
30. Johnson, P. and C. Youmans. 1983
31. Roberts, D. W., and J. T. Sibbernsen. 1979
32. Tisch, E. L. 1961

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
B1500			SERIES: FLOODX HABITAT: PHASE:	Flood plains periodcaly denuded.	
B1000			SERIES: FLOWSX HABITAT: PHASE:	Cinders, lava flow, mud flow, etc.	
B2000			SERIES: ICEXXX HABITAT: PHASE:	Ice fields, glaciers, ice caves	
B3000			SERIES: MINESX HABITAT: PHASE:	Mine tailings, dredgings, pits.	
B0500			SERIES: ROADSX HABITAT: PHASE:	Buildings, structures, roads	
B3500			SERIES: ROCKSX HABITAT: PHASE:	Rock lands	
B4000			SERIES: SANDSX HABITAT: PHASE:	Sands	
B2500			SERIES: SLUMPS HABITAT: PHASE:		
B5000			SERIES: TALUSX HABITAT: PHASE:	Talus lands	
C5000		0110	SERIES. ABIGRA HABITAT: PHASE:	Abies grandis	Grand fir
C5160		01	SERIES: ABIGRA HABITAT: ASACAU PHASE:	Abies grandis Asarum caudatum	Grand fir Wild ginger
C5170		01	SERIES: ABIGRA HABITAT: ASACAU PHASE: ASACAU	Abies grandis Asarum caudatum Asarum caudatum	Grand fir Wild ginger Wild ginger
C5180		01	SERIES: ABIGRA HABITAT: ASACAU PHASE: MENFER	Abies grandis Asarum caudatum Menziesia ferruginea	Grand fir Wild ginger Menziesia

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LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
CS190		01	SERIES: ABIGRA	Abies grandis	Grand fir
			HABITAT: ASACAU	Asarum caudatum	wild ginger
			PHASE: TAXBRE	Taxus brevifolia	Yew
CS200		0110	SERIES: ABIGRA	Abies grandis	Grand fir
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE:		
CS220		10	SERIES: ABIGRA	Abies grandis	Grand fir
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: ARANUD	Aralia nudicaulis	Wild sarsaparilla
CS210		0110	SERIES: ABIGRA	Abies grandis	Grand fir
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: CLIUNI	Clintonia uniflora	Queencup beadlily
CS250		01	SERIES: ABIGRA	Abies grandis	Grand fir
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: MENFER	Menziesia ferruginea	Menziesia
CS240		01	SERIES: ABIGRA	Abies grandis	Grand fir
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: PHYMAL	Physocarpus malvaceus	Ninebark
CS260		01	SERIES: ABIGRA	Abies grandis	Grand fir
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: TAXBRE	Taxus brevifolia	Yew
CS230		0110	SERIES: ABIGRA	Abies grandis	Grand fir
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: XERTEN	Xerophyllum tenax	Beargrass
CS900		0110	SERIES: ABIGRA	Abies grandis	Grand fir
			HABITAT: LINBOR	Linnaea borealis	Twinflower
			PHASE:		
CS910		0110	SERIES: ABIGRA	Abies grandis	Grand fir
			HABITAT: LINBOR	Linnaea borealis	Twinflower
			PHASE: LINBOR	Linnaea borealis	Twinflower
CS920		0110	SERIES: ABIGRA	Abies grandis	Grand fir
			HABITAT LINBOR	Linnaea borealis	Twinflower
			PHASE: XERTEN	Xerophyllum tenax	Beargrass
CS060		01	SERIES: ABIGRA	Abies grandis	Grand fir
			HABITAT: PHYMAL	Physocarpus malvaceus	Ninebark
			PHASE:		
CS070		01	SERIES: ABIGRA	Abies grandis	Grand fir
			HABITAT: PHYMAL	Physocarpus malvaceus	Ninebark
			PHASE: COPOCC	Coptis occidentalis	Gold thread

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES			SCIENTIFIC NAMES	COMMON NAMES
C5080		01	SERIES:	ABIGRA	Abies grandis	Grand fir
			HABITAT:	PHYMAL	Physocarpus malvaceus	Ninebark
			PHASE:	PHYMAL	Physocarpus malvaceus	Ninebark
C5290		01	SERIES:	ABIGRA	Abies grandis	Grand fir
			HABITAT:	SENTRI	Senecio triangularis	Arrowleaf groundsel
			PHASE:			
C5050		01	SERIES:	ABIGRA	Abies grandis	Grand fir
			HABITAT:	SPIBET	Spiraea betulifolia	White spiraea
			PHASE:			
C5150		01	SERIES:	ABIGRA	Abies grandis	Grand fir
			HABITAT:	VACGLO	Vaccinium globulare	Blue huckleberry
			PHASE:			
C5100		0110	SERIES:	ABIGRA	Abies grandis	Grand fir
			HABITAT:	XERTEN	Xerophyllum tenax	Beargrass
			PHASE:			
C5110		01	SERIES:	ABIGRA	Abies grandis	Grand fir
			HABITAT:	XERTEN	Xerophyllum tenax	Beargrass
			PHASE:	COPOCC	Coptis occidentalis	Gold thread
C5120		01	SERIES:	ABIGRA	Abies grandis	Grand fir
			HABITAT:	XERTEN	Xerophyllum tenax	Beargrass
			PHASE:	VACGLO	Vaccinium globulare	Blue huckleberry
C6000		011012	SERIES:	ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT:			
			PHASE:			
C7400		10	SERIES:	ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT:	ALNSIN	Alnus sinuata	Sitka alder
			PHASE:			
C7800		10	SERIES:	ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT:	ARNCOR	Arnica cordifolia	Heartleaf arnica
			PHASE:			
C6500		0110	SERIES:	ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT:	CALCAN	Calamagrostis canadensis	Bluejoint reedgrass
			PHASE:			
C6510		0110	SERIES:	ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT:	CALCAN	Calamagrostis canadensis	Bluejoint reedgrass
			PHASE:	CALCAN	Calamagrostis canadensis	Bluejoint reedgrass
C6530		10	SERIES:	ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT:	CALCAN	Calamagrostis canadensis	Bluejoint reedgrass
			PHASE:	GALTRI	Galium triflorum	Sweetscented bedstraw

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
C6550		01	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: CALCAN	Calamagrostis canadensis	Bluejoint reedgrass
			PHASE: LEDGLA	Ledum glandulosum	Labrador tea
C6520		01	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: CALCAN	Calamagrostis canadensis	Bluejoint reedgrass
			PHASE: LIGCAN	Ligusticum canbyi	Canby's ligusticum
C6540		0110	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: CALCAN	Calamagrostis canadensis	Bluejoint reedgrass
			PHASE: VACCAE	Vaccinium caespitosum	Dwarf huckleberry
C7500		0110	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: CALRUB	Calamagrostis rubescens	Pinegrass
			PHASE:		
C7900		10	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: CARGEY	Carex geyeri	Elk sedge
			PHASE:		
C7910		10	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: CARGEY	Carex geyeri	Elk sedge
			PHASE: CARGEY	Carex geyeri	Elk sedge
C7920		10	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: CARGEY	Carex geyeri	Elk sedge
			PHASE: PSEMEN	Pseudotsuga menziesii	Douglas-fir
C7700		10	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: CLECOU	Clematis columbiana	Columbia clematis
			PHASE:		
C6200		0110	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE:		
C6220		10	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: ARANUD	Aralia nudicaulis	Wild sarsaparilla
C6210		0110	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: CLIUNI	Clintonia uniflora	Queencup beadlily
C6250		0110	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: MENFER	Menziesia ferruginea	Menziesia
C6230		10	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: VACCAE	Vaccinium caespitosum	Dwarf huckleberry

LISTING OF ECOTYPE CODES

CODE	OTHER EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
C6240		0110	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: XERTEN	Xerophyllum tenax	Beargrass
C6300		0110	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: GALTRI	Gallium triflorum	Sweetscented bedstraw
			PHASE:		
C7600		12	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: JUNCOM	Juniperus communis	Common juniper
			PHASE:		
C6600		1012	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: LINBOR	Linnaea borealis	Twinflower
			PHASE:		
C6610		10	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: LINBOR	Linnaea borealis	Twinflower
			PHASE: LINBOR	Linnaea borealis	Twinflower
C6630		10	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: LINBOR	Linnaea borealis	Twinflower
			PHASE: VACSCO	Vaccinium scoparium	Grouse whortleberry
C6620		10	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: LINBOR	Linnaea borealis	Twinflower
			PHASE: XERTEN	Xerophyllum tenax	Beargrass
C8300		0110	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: LUZHIT	Luzula hitchcockii	Smooth woodrush
			PHASE:		
C8320		10	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: LUZHIT	Luzula hitchcockii	Smooth woodrush
			PHASE: MENFER	Menziesia ferruginea	Menziesia
C8310		10	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: LUZHIT	Luzula hitchcockii	Smooth woodrush
			PHASE: VACSCO	Vaccinium scoparium	Grouse whortleberry
C6700		0110	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: MENFER	Menziesia ferruginea	Menziesia
			PHASE:		
C6710		01	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: MENFER	Menziesia ferruginea	Menziesia
			PHASE: COPOCC	Coptis occidentalis	Gold thread
C6720		01	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: MENFER	Menziesia ferruginea	Menziesia
			PHASE: LUZHIT	Luzula hitchcockii	Smooth woodrush

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
C6740		01	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: MENFER	Menziesia ferruginea	Menziesia
			PHASE: VACSCO	Vaccinium scoparium	Grouse whortleberry
C6730		01	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: MENFER	Menziesia ferruginea	Menziesia
			PHASE: XERTEN	Xerophyllum tenax	Beargrass
C6100		0110	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: OPLHOR	Oplopanax horridum	Devil's club
			PHASE:		
C8100		10	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: RIBMON	Ribes montigenum	Mountain gooseberry
			PHASE:		
C6350		01	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: STRAMP	Streptopus amplexifolius	Twisted stalk
			PHASE:		
C6370		01	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: STRAMP	Streptopus amplexifolius	Twisted stalk
			PHASE: LIGCAN	Ligusticum canbyi	Canby's ligusticum
C6360		01	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: STRAMP	Streptopus amplexifolius	Twisted stalk
			PHASE: MENFER	Menziesia ferruginea	Menziesia
C8000		16	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: THAOCC	Thalictrum occidentale	Western meadowrue
			PHASE:		
C8010		16	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: THAOCC	Thalictrum occidentale	Western meadowrue
			PHASE: ARNCOR	Arnica cordifolia	Heartleaf arnica
C8030		16	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: THAOCC	Thalictrum occidentale	Western meadowrue
			PHASE: THAOCC	Thalictrum occidentale	Western meadowrue
C6400		0110	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: VACCAE	Vaccinium caespitosum	Dwarf huckleberry
			PHASE:		
C7200		0110	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: VACGLO	Vaccinium globulare	Blue huckleberry
			PHASE:		
C7300		0110	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: VACSCO	Vaccinium scoparium	Grouse whortleberry
			PHASE:		

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
C7310		10	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: VACSCO	Vaccinium scoparium	Grouse whortleberry
			PHASE: CALRUB	Calamagrostis rubescens	Pinegrass
C7330		10	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: VACSCO	Vaccinium scoparium	Grouse whortleberry
			PHASE: THAOCC	Thalictrum occidentale	Western meadowrue
C7320		10	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: VACSCO	Vaccinium scoparium	Grouse whortleberry
			PHASE: VACSCO	Vaccinium scoparium	Grouse whortleberry
C6900		0110	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: XERTEN	Xerophyllum tenax	Beargrass
			PHASE:		
C6930		01	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: XERTEN	Xerophyllum tenax	Beargrass
			PHASE: COPOCC	Coptis occidentalis	Gold thread
C6940		01	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: XERTEN	Xerophyllum tenax	Beargrass
			PHASE: LUZMIT	Luzula hitchcockii	Smooth woodrush
C6910		0110	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: XERTEN	Xerophyllum tenax	Beargrass
			PHASE: VACGLO	Vaccinium globulare	Blue huckleberry
C6920		0110	SERIES: ABILAS	Abies lasiocarpa	Subalpine fir
			HABITAT: XERTEN	Xerophyllum tenax	Beargrass
			PHASE: VACSCO	Vaccinium scoparium	Grouse whortleberry
C8200		10	SERIES: ABIPIN	Abies lasiocarpa-Pinus albicaulis	Subalpine fir-Whitbark pine
			HABITAT: VACSCO	Vaccinium scoparium	Grouse whortleberry
			PHASE:		
C8600		0110	SERIES: LARABI	Larix lyalli-Abies lasiocarpa	Subalpine larch-Subalpine fir
			HABITAT:		
			PHASE:		
C4000		1012	SERIES: PICEAX	Picea spp.	Spruce
			HABITAT:		
			PHASE:		
C4200		10	SERIES: PICEAX	Picea spp.	Spruce
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE:		
C4220		10	SERIES: PICEAX	Picea spp.	Spruce
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: CLIUNI	Clintonia uniflora	Queencup beadlily

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
C4210		10	SERIES: PICEAX	Picea spp.	Spruce
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: VACCAE	Vaccinium caespitosum	Dwarf huckleberry
C4100		10	SERIES: PICEAX	Picea spp.	Spruce
			HABITAT: EQUARV	Equisetum arvense	Common horsetail
			PHASE:		
C4400		10	SERIES: PICEAX	Picea spp.	Spruce
			HABITAT: GALTRI	Galium triflorum	Sweetscented bedstraw
			PHASE:		
C4850		12	SERIES: PICEAX	Picea spp.	Spruce
			HABITAT: JUNCOM	Juniperus communis	Common juniper
			PHASE:		
C4700		1012	SERIES: PICEAX	Picea spp.	Spruce
			HABITAT: LINBOR	Linnaea borealis	Twinflower
			PHASE:		
C4900		25	SERIES: PICEAX	Picea spp.	Spruce
			HABITAT: LYSAME	Lysichiton americanum	Skunk cabbage
			PHASE:		
C4300		10	SERIES: PICEAX	Picea spp.	Spruce
			HABITAT: PHYMAL	Physocarpus malvaceus	Ninebark
			PHASE:		
C4600		10	SERIES: PICEAX	Picea spp.	Spruce
			HABITAT: SENSTR	Senecio streptanthifolius	Cleft-leaf groundsel
			PHASE:		
C4620		10	SERIES: PICEAX	Picea spp.	Spruce
			HABITAT: SENSTR	Senecio streptanthifolius	Cleft-leaf groundsel
			PHASE: PICEAX	Picea spp.	Spruce
C4610		10	SERIES: PICEAX	Picea spp.	Spruce
			HABITAT: SENSTR	Senecio streptanthifolius	Cleft-leaf groundsel
			PHASE: PSEMEN	Pseudotsuga menziesii	Douglas-fir
C4800		10	SERIES: PICEAX	Picea spp.	Spruce
			HABITAT: SMISTE	Smilacina stellata	Starry Solomon's seal
			PHASE:		
C4500		10	SERIES: PICEAX	Picea spp.	Spruce
			HABITAT: VACCAE	Vaccinium caespitosum	Dwarf huckleberry
			PHASE:		
C8500		0110	SERIES: PINABI	Pinus albicaulis-Abies lasiocarpa	Whitebark pine-Subalpine fir
			HABITAT:		
			PHASE:		

LISTING OF ECOTYPE CODES

CODE	OTHER EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
C8700		10	SERIES: PINALB HABITAT: PHASE:	Pinus albicaulis	Whitebark pine
C8720		26	SERIES: PINALB HABITAT: VACSCO PHASE:	Pinus albicaulis Vaccinium scoparium	Whitebark pine Grouse whortleberry.
C9000		0110	SERIES: PINCON HABITAT: PHASE:	Pinus contorta	Lodgepole pine
C9500		10	SERIES: PINCON HABITAT: CALRUB PHASE:	Pinus contorta Calamagrostis rubescens	Lodgepole pine Pinegrass
C9600		12	SERIES: PINCON HABITAT: JUNCOM PHASE:	Pinus contorta Juniperus communis	Lodgepole pine Common juniper
C9300		10	SERIES: PINCON HABITAT: LINBOR PHASE:	Pinus contorta Linnaea borealis	Lodgepole pine Twinflower
C9100		10	SERIES: PINCON HABITAT: PURTRI PHASE:	Pinus contorta Purshia tridentata	Lodgepole pine Bitterbrush
C9200		0110	SERIES: PINCON HABITAT: VACCAE PHASE:	Pinus contorta Vaccinium caespitosum	Lodgepole pine Dwarf huckleberry
C9400		0110	SERIES: PINCON HABITAT: VACSCO PHASE:	Pinus contorta Vaccinium scoparium	Lodgepole pine Grouse whortleberry
C9250		01	SERIES: PINCON HABITAT: XERTEN PHASE:	Pinus contorta Xerophyllum tenax	Lodgepole pine Beargrass
C0900		10	SERIES: PINFLE HABITAT: PHASE:	Pinus flexilis	Limber pine
C0910		0310	SERIES: PINFLE HABITAT: AGRSPI PHASE:	Pinus flexilis Agropyron spicatum	Limber pine Bluebunch wheatgrass
C0920		10	SERIES: PINFLE HABITAT: FESIDA PHASE:	Pinus flexilis Festuca idahoensis	Limber pine Idaho fescue

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
C0930		10	SERIES: PINFLE	Pinus flexilis	Limber pine
			HABITAT FESIDA	Festuca idahoensis	Idaho fescue
			PHASE: FESIDA	Festuca idahoensis	Idaho fescue
C0940		10	SERIES: PINFLE	Pinus flexilis	Limber pine
			HABITAT: FESIDA	Festuca idahoensis	Idaho fescue
			PHASE. FESSCA	Festuca scabrella	Rough fescue
C0950		10	SERIES: PINFLE	Pinus flexilis	Limber pine
			HABITAT. JUNCOM	Juniperus communis	Common juniper
			PHASE:		
C1000		011012	SERIES PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT.		
			PHASE:		
C1300		01061012	SERIES. PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT. AGRSPI	Agropyron spicatum	Bluebunch wheatgrass
			PHASE:		
C1020		12	SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT. AMEALN	Amelanchier alnifolia	Serviceberry
			PHASE		
C1100		10	SERIES. PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT. ANDROP	Andropogon spp.	Bluestem
			PHASE.		
C1010			SERIES. PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT: ARCUVA	Arctostaphylos uva-ursi	Kinnikinnick
			PHASE:		
C1030		06	SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT. CARHEL	Carex heliophila	Carex heliophila
			PHASE:		
C1400		01061012	SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT: FESIDA	Festuca idahoensis	Idaho fescue
			PHASE:		
C1410		10	SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT. FESIDA	Festuca idahoensis	Idaho fescue
			PHASE: FESIDA	Festuca idahoensis	Idaho fescue
C1420		1012	SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT: FESIDA	Festuca idahoensis	Idaho fescue
			PHASE: FESSCA	Festuca scabrella	Rough fescue
C1040		08	SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT: JUNCOM	Juniperus communis	Common juniper
			PHASE:		

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
C1050		03	SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT: JUNSCO	Juniperus scopulorum	Rocky Mountain juniper
			PHASE:		
C1900		01	SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT: PHYMAL	Physocarpus malvaceus	Ninebark
			PHASE:		
C1800		06,10	SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT: PRUVIR	Prunus virginiana	Chokecherry
			PHASE:		
C1810		10	SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT: PRUVIR	Prunus virginiana	Chokecherry
			PHASE: PRUVIR	Prunus virginiana	Chokecherry
C1820		10	SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT: PRUVIR	Prunus virginiana	Chokecherry
			PHASE: SHECAN	Shepherdia canadensis	Buffaloberry
C1600		10	SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT: PURTRI	Purshia tridentata	Bitterbrush
			PHASE:		
C1610		10	SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT: PURTRI	Purshia tridentata	Bitterbrush
			PHASE: AGRSPI	Agropyron spicatum	Bluebunch wheatgrass
C1620		10	SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT: PURTRI	Purshia tridentata	Bitterbrush
			PHASE: FESIDA	Festuca idahoensis	Idaho fescue
C1550		01	SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT: RHUTRI	Rhus trilobata	Skunkbrush
			PHASE:		
C1200			SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT: STICOM	Stipa comata	Needle-and-thread
			PHASE:		
C1700		10	SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT: SYMALB	Symphoricarpos albus	Snowberry
			PHASE:		
C1720		10	SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT: SYMALB	Symphoricarpos albus	Snowberry
			PHASE: BERREP	Berberis repens	Creeping oregon grape
C1710		10	SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT: SYMALB	Symphoricarpos albus	Snowberry
			PHASE: SYMALB	Symphoricarpos albus	Snowberry

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
C1500		01	SERIES: PINPON	Pinus ponderosa	Ponderosa pine
			HABITAT: SYMOCC	Symphoricarpos occidentalis	Western snowberry
			PHASE:		
C2000		011012	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT:		
			PHASE:		
C2100		0110	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: AGRSPI	Agropyron spicatum	Bluebunch wheatgrass
			PHASE:		
C2050		12	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: AMEALN	Amelanchier alnifolia	Serviceberry
			PHASE		
C3500		10	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: ARCUVA	Arctostaphylos uva-ursi	Kinnikinnick
			PHASE:		
C3700		10	SERIES PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: ARNCOR	Arnica cordifolia	Heartleaf arnica
			PHASE:		
C2400			SERIES PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: BERREP	Berberis repens	Creeping oregon grape
			PHASE:		
C3200		0110	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: CALRUB	Calamagrostis rubescens	Pinegrass
			PHASE:		
C3210		10	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: CALRUB	Calamagrostis rubescens	Pinegrass
			PHASE: AGRSPI	Agropyron spicatum	Bluebunch wheatgrass
C3220		0110	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: CALRUB	Calamagrostis rubescens	Pinegrass
			PHASE: ARCUVA	Arctostaphylos uva-ursi	Kinnikinnick
C3230		0110	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: CALRUB	Calamagrostis rubescens	Pinegrass
			PHASE: CALRUB	Calamagrostis rubescens	Pinegrass
C3250			SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: CALRUB	Calamagrostis rubescens	Pinegrass
			PHASE: PACMYR	Pachistima myrsinites	Pachistima
C3240		10	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: CALRUB	Calamagrostis rubescens	Pinegrass
			PHASE: PINPON	Pinus ponderosa	Ponderosa pine

LISTING OF ECOTYPE CODES

CODE	.THER:EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
C3300		0110	SERIES: PSEMEN HABITAT: CAREGY PHASE:	Pseudotsuga menziesii Carex geyeri	Douglas-fir Elk sedge
C2700		12	SERIES: PSEMEN HABITAT: CORCAN PHASE:	Pseudotsuga menziesii Cornus canadensis	Douglas-fir Bunchberry dogwood
C2200		0110	SERIES: PSEMEN HABITAT: FESIDA PHASE:	Pseudotsuga menziesii Festuca idahoensis	Douglas-fir Idaho fescue
C2300		10	SERIES: PSEMEN HABITAT: FESSCA PHASE:	Pseudotsuga menziesii Festuca scabrella	Douglas-fir Rough fescue
C3600		10	SERIES: PSEMEN HABITAT: JUNCOM PHASE:	Pseudotsuga menziesii Juniperus communis	Douglas-fir Common juniper
C2900		1012	SERIES: PSEMEN HABITAT: LINBOR PHASE:	Pseudotsuga menziesii Linnaea borealis	Douglas-fir Twinflower
C2920		10	SERIES: PSEMEN HABITAT: LINBOR PHASE: CALRUB	Pseudotsuga menziesii Linnaea borealis Calamagrostis rubescens	Douglas-fir Twinflower Pinegrass
C2910		10	SERIES: PSEMEN HABITAT: LINBOR PHASE: SYMALB	Pseudotsuga menziesii Linnaea borealis Symphoricarpos albus	Douglas-fir Twinflower Snowberry
C2930		10	SERIES: PSEMEN HABITAT: LINBOR PHASE: VACGLO	Pseudotsuga menziesii Linnaea borealis Vaccinium globulare	Douglas-fir Twinflower Blue huckleberry
C2350		30	SERIES: PSEMEN HABITAT: MUHCUS PHASE:	Pseudotsuga menziesii Muhlenbergia cuspidata	Douglas-fir Plains muhly
C2600		0110	SERIES: PSEMEN HABITAT: PHYMAL PHASE:	Pseudotsuga menziesii Physocarpus malvaceus	Douglas-fir Ninebark
C2620		10	SERIES: PSEMEN HABITAT: PHYMAL PHASE: CALRUB	Pseudotsuga menziesii Physocarpus malvaceus Calamagrostis rubescens	Douglas-fir Ninebark Pinegrass
C2610		0110	SERIES: PSEMEN HABITAT: PHYMAL PHASE: PHYMAL	Pseudotsuga menziesii Physocarpus malvaceus Physocarpus malvaceus	Douglas-fir Ninebark Ninebark

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
C2630		01	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: PHYMAL	Physocarpus malvaceus	Ninebark
			PHASE: SMISTE	Smilacina stellata	Starry Solomon's seal
C3400		0110	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: SPIBET	Spiraea betulifolia	White spiraea
			PHASE:		
C3100		0110	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: SYMALB	Symphoricarpos albus	Snowberry
			PHASE:		
C3110		10	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: SYMALB	Symphoricarpos albus	Snowberry
			PHASE: AGRSPI	Agropyron spicatum	Bluebunch wheatgrass
C3120		10	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: SYMALB	Symphoricarpos albus	Snowberry
			PHASE: CALRUB	Calamagrostis rubescens	Pinegrass
C3130		10	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: SYMALB	Symphoricarpos albus	Snowberry
			PHASE: SYMALB	Symphoricarpos albus	Snowberry
C3900		12	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: SYMOCC	Symphoricarpos occidentalis	Western snowberry
			PHASE:		
C3800		10	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: SYMORE	Symphoricarpos oreophilus	Mountain snowberry
			PHASE:		
C2500		0110	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: VACCAE	Vaccinium caespitosum	Dwarf huckleberry
			PHASE:		
C2800		0110	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: VACGLO	Vaccinium globulare	Blue huckleberry
			PHASE:		
C2820		10	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: VACGLO	Vaccinium globulare	Blue huckleberry
			PHASE: ARCUVA	Arctostaphylos uva-ursi	Kinnikinnick
C2810		10	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: VACGLO	Vaccinium globulare	Blue huckleberry
			PHASE: VACGLO	Vaccinium globulare	Blue huckleberry
C2830		10	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: VACGLO	Vaccinium globulare	Blue huckleberry
			PHASE: XERTEN	Xerophyllum tenax	Beargrass

LISTING OF ECOTYPE CODES

CODE	OTHER EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
C3000		12	SERIES: PSEMEN	Pseudotsuga menziesii	Douglas-fir
			HABITAT: VIOCAN	Viola canadensis	Canada violet
			PHASE:		
C5010		0110	SERIES: THUPLI	Thuja plicata	Western redcedar
			HABITAT:		
			PHASE:		
C5600		01	SERIES: THUPLI	Thuja plicata	Western redcedar
			HABITAT: ADIPED	Adiantum pedatum	Maidenhair fern
			PHASE:		
C5450		01	SERIES: THUPLI	Thuja plicata	Western redcedar
			HABITAT: ASACAU	Asarum caudatum	Wild ginger
			PHASE:		
C5460		01	SERIES: THUPLI	Thuja plicata	Western redcedar
			HABITAT: ASACAU	Asarum caudatum	Wild ginger
			PHASE: ASACAU	Asarum caudatum	Wild ginger
C5470		01	SERIES: THUPLI	Thuja plicata	Western redcedar
			HABITAT: ASACAU	Asarum caudatum	Wild ginger
			PHASE. MENFER	Menziesia ferruginea	Menziesia
C5480		01	SERIES: THUPLI	Thuja plicata	Western redcedar
			HABITAT: ASACAU	Asarum caudatum	Wild ginger
			PHASE: TAXBRE	Taxus brevifolia	Yew
C5400		01	SERIES: THUPLI	Thuja plicata	Western redcedar
			HABITAT: ATHFIL	Athyrium filix-femina	Lady fern
			PHASE:		
C5410		01	SERIES: THUPLI	Thuja plicata	Western redcedar
			HABITAT. ATHFIL	Athyrium filix-femina	Lady fern
			PHASE: ADIPED	Adiantum pedatum	Maidenhair fern
C5420		01	SERIES: THUPLI	Thuja plicata	Western redcedar
			HABITAT. ATHFIL	Athyrium filix-femina	Lady fern
			PHASE: ATHFIL	Athyrium filix-femina	Lady fern
C5300		0110	SERIES: THUPLI	Thuja plicata	Western redcedar
			HABITAT. CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE:		
C5320		10	SERIES: THUPLI	Thuja plicata	Western redcedar
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: ARANUD	Aralia nudicaulis	Wild sarsaparilla
C5310		0110	SERIES: THUPLI	Thuja plicata	Western redcedar
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: CLIUNI	Clintonia uniflora	Queencup beadlily

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
C5330		0110	SERIES: THUPLI	Thuja plicata	Western redcedar
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: MENFER	Menziesia ferruginea	Menziesia
C5350		01	SERIES: THUPLI	Thuja plicata	Western redcedar
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: TAXBRE	Taxus brevifolia	Yew
C5340		01	SERIES: THUPLI	Thuja plicata	Western redcedar
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: XERTEN	Xerophyllum tenax	Beargrass
C5550		01	SERIES: THUPLI	Thuja plicata	Western redcedar
			HABITAT: GYMDRY	Gymnocarpium dryopteris	Oak fern
			PHASE:		
C5500		0110	SERIES: THUPLI	Thuja plicata	Western redcedar
			HABITAT: OPLHOR	Oplopanax horridum	Devil's club
			PHASE:		
C5020		0110	SERIES: TSUHET	Tsuga heterophylla	Western hemlock
			HABITAT:		
			PHASE:		
C5750		01	SERIES: TSUHET	Tsuga heterophylla	Western hemlock
			HABITAT: ASACAU	Asarum caudatum	Wild ginger
			PHASE:		
C5760		01	SERIES: TSUHET	Tsuga heterophylla	Western hemlock
			HABITAT: ASACAU	Asarum caudatum	Wild ginger
			PHASE: ARANUD	Aralia nudicaulis	Wild sarsaparilla
C5780		01	SERIES: TSUHET	Tsuga heterophylla	Western hemlock
			HABITAT: ASACAU	Asarum caudatum	Wild ginger
			PHASE: ASACAU	Asarum caudatum	Wild ginger
C5770		01	SERIES: TSUHET	Tsuga heterophylla	Western hemlock
			HABITAT: ASACAU	Asarum caudatum	Wild ginger
			PHASE: MENFER	Menziesia ferruginea	Menziesia
C5700		0110	SERIES: TSUHET	Tsuga heterophylla	Western hemlock
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE:		
C5720		0110	SERIES: TSUHET	Tsuga heterophylla	Western hemlock
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: ARANUD	Aralia nudicaulis	Wild sarsaparilla
C5710		0110	SERIES: TSUHET	Tsuga heterophylla	Western hemlock
			HABITAT: CLIUNI	Clintonia uniflora	Queencup beadlily
			PHASE: CLIUNI	Clintonia uniflora	Queencup beadlily

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
C5730		01	SERIES: TSUMET HABITAT: CLIUNI PHASE: MENFER	Tsuga heterophylla Clintonia uniflora Menziesia ferruginea	Western hemlock Queencup beadlily Menziesia
C5740		01	SERIES: TSUMET HABITAT: CLIUNI PHASE: XERTEN	Tsuga heterophylla Clintonia uniflora Xerophyllum tenax	Western hemlock Queencup beadlily Beargrass
C5850		01	SERIES: TSUMET HABITAT: GYMDRY PHASE:	Tsuga heterophylla Gymnocarpium dryopteris	Western hemlock Oak fern
C5790		01	SERIES: TSUMET HABITAT: MENFER PHASE:	Tsuga heterophylla Menziesia ferruginea	Western hemlock Menziesia
C7010		01	SERIES: TSUMER HABITAT: PHASE:	Tsuga mertensiana	Mountain hemlock
C6850		01	SERIES: TSUMER HABITAT: CLIUNI PHASE:	Tsuga mertensiana Clintonia uniflora	Mountain hemlock Queencup beadlily
C6860		01	SERIES: TSUMER HABITAT: CLIUNI PHASE: MENFER	Tsuga mertensiana Clintonia uniflora Menziesia ferruginea	Mountain hemlock Queencup beadlily Menziesia
C6870		01	SERIES: TSUMER HABITAT: CLIUNI PHASE: XERTEN	Tsuga mertensiana Clintonia uniflora Xerophyllum tenax	Mountain hemlock Queencup beadlily Beargrass
C8400		0110	SERIES: TSUMER HABITAT: LUZHIT PHASE:	Tsuga mertensiana Luzula hitchcockii	Mountain hemlock Smooth woodrush
C8420		10	SERIES: TSUMER HABITAT: LUZHIT PHASE: MENFER	Tsuga mertensiana Luzula hitchcockii Menziesia ferruginea	Mountain hemlock Smooth woodrush Menziesia
C8410		10	SERIES: TSUMER HABITAT: LUZHIT PHASE: VACSCO	Tsuga mertensiana Luzula hitchcockii Vaccinium scoparium	Mountain hemlock Smooth woodrush Grouse whortleberry
C6800		0110	SERIES: TSUMER HABITAT: MENFER PHASE:	Tsuga mertensiana Menziesia ferruginea	Mountain hemlock Menziesia
C6810		01	SERIES: TSUMER HABITAT: MENFER PHASE: LUZHIT	Tsuga mertensiana Menziesia ferruginea Luzula hitchcockii	Mountain hemlock Menziesia Smooth woodrush

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES			SCIENTIFIC NAMES	COMMON NAMES
C6820		01	SERIES:	TSUMER	Tsuga mertensiana	Mountain hemlock
			HABITAT:	MENFER	Menziesia ferruginea	Menziesia
			PHASE:	XERTEN	Xerophyllum tenax	Beargrass
C6750		01	SERIES:	TSUMER	Tsuga mertensiana	Mountain hemlock
			HABITAT:	STRAMP	Streptopus amplexifolius	Twisted stalk
			PHASE:			
C6760		01	SERIES:	TSUMER	Tsuga mertensiana	Mountain hemlock
			HABITAT:	STRAMP	Streptopus amplexifolius	Twisted stalk
			PHASE:	LUZHIT	Luzula hitchcockii	Smooth woodrush
C6770		01	SERIES:	TSUMER	Tsuga mertensiana	Mountain hemlock
			HABITAT:	STRAMP	Streptopus amplexifolius	Twisted stalk
			PHASE:	MENFER	Menziesia ferruginea	Menziesia
C7100		0110	SERIES:	TSUMER	Tsuga mertensiana	Mountain hemlock
			HABITAT:	XERTEN	Xerophyllum tenax	Beargrass
			PHASE:			
C7110		01	SERIES:	TSUMER	Tsuga mertensiana	Mountain hemlock
			HABITAT:	XERTEN	Xerophyllum tenax	Beargrass
			PHASE:	LUZHIT	Luzula hitchcockii	Smooth woodrush
C7130		01	SERIES:	TSUMER	Tsuga mertensiana	Mountain hemlock
			HABITAT:	XERTEN	Xerophyllum tenax	Beargrass
			PHASE:	VACSCO	Vaccinium scoparium	Grouse whortleberry
C7120		01	SERIES:	TSUMER	Tsuga mertensiana	Mountain hemlock
			HABITAT:	XERTEN	Xerophyllum tenax	Beargrass
			PHASE:	XERTEN	Xerophyllum tenax	Beargrass
D1000			SERIES:	JUNOST	Juniperus osteosperma	Utah juniper
			HABITAT:			
			PHASE:			
D1500			SERIES:	JUNSCO	Juniperus scopulorum	Rocky Mountain juniper
			HABITAT:			
			PHASE:			
D1510		06	SERIES:	JUNSCO	Juniperus scopulorum	Rocky Mountain juniper
			HABITAT:	AGRSPI	Agropyron spicatum	Bluebunch wheatgrass
			PHASE:			
D1520		030506	SERIES:	JUNSCO	Juniperus scopulorum	Rocky Mountain juniper
			HABITAT:	ORYMIC	Oryzopsis micrantha	Littleseed ricegrass
			PHASE:			
E0300		1718	SERIES:	ACENEG	Acer negundo	Boxelder
			HABITAT:			
			PHASE:			

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES			SCIENTIFIC NAMES	COMMON NAMES
E1000	F	04	SERIES: HABITAT: PHASE:	ALNINC	Alnus incana	Thinleaf alder
E0500		02	SERIES: HABITAT: PHASE:	ALNRHO	Alnus rhombifolia	White alder
E1500			SERIES: HABITAT: PHASE:	BETPAP	Betula papyrifera	Paper birch
E2010		03	SERIES: HABITAT: PHASE:	BETPAP CLECOU	Betula papyrifera Clematis columbiana	Paper birch Columbia clematis
E2020		03	SERIES: HABITAT: PHASE:	BETPAP CORCOR	Betula papyrifera Corylus cornulata	Paper birch Hazelnut
E2500		02	SERIES: HABITAT: PHASE:	CRADOU	Crataegus douglasii	Douglas hawthorn
E2510		02	SERIES: HABITAT: PHASE:	CRADOU HERLAN	Crataegus douglasii Heracleum lanatum	Douglas hawthorn Cow parsnip
E2511		02	SERIES: HABITAT: PHASE:	CRADOU HERLAN POPTRE	Crataegus douglasii Heracleum lanatum Populus tremuloides	Douglas hawthorn Cow parsnip Quaking aspen
E2520	F	02	SERIES: HABITAT: PHASE:	CRADOU SYMALB	Crataegus douglasii Symphoricarpos albus	Douglas hawthorn Snowberry
E2521		02	SERIES: HABITAT: PHASE:	CRADOU SYMALB POPTRE	Crataegus douglasii Symphoricarpos albus Populus tremuloides	Douglas hawthorn Snowberry Quaking aspen
E3000			SERIES: HABITAT: PHASE:	FRAPEN	Fraxinus pennsylvanica	Green ash
E3010		030506	SERIES: HABITAT: PHASE:	FRAPEN PRUVIR	Fraxinus pennsylvanica Prunus virginiana	Green ash Chokecherry
E3030		0305	SERIES: HABITAT: PHASE:	FRAPEN SYMOCC	Fraxinus pennsylvanica Symphoricarpos occidentalis	Green ash Western snowberry

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
E3020		03	SERIES: FRAPEN HABITAT: ULAMER PHASE:	Fraxinus pennsylvanica Ulmus americana	Green ash American elm
E6500		28	SERIES: POPANG HABITAT: PHASE:	Populus angustifolia	Narrowleaf cottonwood
E7500			SERIES: POPDEL HABITAT: PHASE:	Populus deltoides	Eastern cottonwood
E7510		03	SERIES: POPDEL HABITAT: FRAPEN PHASE:	Populus deltoides Fraxinus pennsylvanica	Eastern cottonwood Green ash
E7511		03	SERIES: POPDEL HABITAT: FRAPEN PHASE: JUNCOM	Populus deltoides Fraxinus pennsylvanica Juniperus communis	Eastern cottonwood Green ash Common juniper
E3500			SERIES: POPTRE HABITAT: PHASE:	Populus tremuloides	Quaking aspen
E3510		06	SERIES: POPTRE HABITAT: BERREP PHASE:	Populus tremuloides Berberis repens	Quaking aspen Creeping oregon grape
E3520		05	SERIES: POPTRE HABITAT: BETOCC PHASE:	Populus tremuloides Betula occidentalis	Quaking aspen Water birch
E3530		11	SERIES: POPTRE HABITAT: EQUARV PHASE:	Populus tremuloides Equisetum arvense	Quaking aspen Common horsetail
E3540		0305	SERIES: POPTRE HABITAT: PRUVIR PHASE:	Populus tremuloides Prunus virginiana	Quaking aspen Chokecherry
E3550		03	SERIES: POPTRE HABITAT: QUEMAC PHASE:	Populus tremuloides Quercus macrocarpa	Quaking aspen Bur oak
E6000		11	SERIES: POPTRI HABITAT: PHASE:	Populus trichocarpa	Black cottonwood
E6040		03	SERIES: POPTRI HABITAT: BETPAP PHASE:	Populus trichocarpa Betula papyrifera	Black cottonwood Paper birch

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
E6010		02	SERIES: POPTRI HABITAT: CICDOU PHASE:	Populus trichocarpa Cicuta douglasii	Black cottonwood Douglas water hemlock
E6020		11	SERIES: POPTRI HABITAT: CORSTO PHASE:	Populus trichocarpa Cornus stolonifera	Black cottonwood Redosier dogwood
E6030		11	SERIES: POPTRI HABITAT: POAPRA PHASE:	Populus trichocarpa Poa pratensis	Black cottonwood Kentucky bluegrass
E7000			SERIES: QUEMAC HABITAT: PHASE:	Quercus macrocarpa	Bur oak
E7010			SERIES: QUEMAC HABITAT: CORCOR PHASE:	Quercus macrocarpa Corylus cornulata	Bur oak Hazelnut
E7020		03	SERIES: QUEMAC HABITAT: PRUVIR PHASE:	Quercus macrocarpa Prunus virginiana	Bur oak Chokecherry
F0500	E	11	SERIES: ALNINC HABITAT: PHASE:	Alnus incana	Thinleaf alder
F6000	W		SERIES: ALNSIN HABITAT: PHASE:	Alnus sinuata	Sitka alder
F1000		11	SERIES: BETGLA HABITAT: PHASE:	Betula glandulosa	Bog birch
F1010		11	SERIES: BETGLA HABITAT: CARROS PHASE:	Betula glandulosa Carex rostrata	Bog birch Beaked sedge
F1020		11	SERIES: BETGLA HABITAT: DESCES PHASE:	Betula glandulosa Deschampsia cespitosa	Bog birch Tufted hairgrass
F1500	E	11	SERIES: CORSTO HABITAT: PHASE:	Cornus stolonifera	Redosier dogwood
F1700			SERIES: CRADOU HABITAT PHASE:	Crataegus douglasii	Douglas hawthorn

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES			SCIENTIFIC NAMES	COMMON NAMES
F1800		1722	SERIES: HABITAT: PHASE:	CRASUC	Crataegus succulenta	Round-leaved hawthorn
F1900			SERIES: HABITAT: PHASE:	ELACUM	Elaeagnus commutata	Silverberry
F2000		11	SERIES: HABITAT: PHASE:	KALMIC	Kalmia microphylla	Alpine bog kalmia
F2500	M		SERIES: HABITAT: PHASE:	POTFRU	Potentilla fruticosa	Shrubby cinquefoil
F2510		11	SERIES: HABITAT: PHASE:	POTFRU DESCES	Potentilla fruticosa Deschampsia cespitosa	Shrubby cinquefoil Tufted hairgrass
F9000		30	SERIES: HABITAT: PHASE:	PRUAME	Prunus americana	Wild plum
F9200		1730	SERIES: HABITAT: PHASE:	PRUVIR	Prunus virginiana	Chokecherry
F3200			SERIES: HABITAT: PHASE:	SALBEB	Salix bebbiana	Bebb willow
F8000			SERIES: HABITAT: PHASE:	SALCAN	Salix candida	Hoary willow
F3000		11	SERIES: HABITAT: PHASE:	SALDRU	Salix drummondiana	Drummond willow
F3010		11	SERIES: HABITAT: PHASE:	SALDRU POTPAL	Salix drummondiana Potentilla palustris	Drummond willow Marsh cinquefoil
F3500		11	SERIES: HABITAT: PHASE:	SALEXI	Salix exigua	Riverbank willow
F4000		11	SERIES: HABITAT: PHASE:	SALFAR	Salix farriae	Farr's willow

LISTING OF ECOTYPE CODES

CODE	OTHER EL	REFERENCES			SCIENTIFIC NAMES	COMMON NAMES
F4500		11	SERIES: HABITAT: PHASE:	SALGEY	Salix geyeriana	Geyer willow
F5500	J	11	SERIES: HABITAT: PHASE:	SALPLA	Salix planifolia	Tealeaf willow
F7000		06	SERIES: HABITAT: PHASE:	SHEARG	Shepherdia argentea	Thorny buffalo-berry
F6500		06	SERIES: HABITAT: PHASE:	SYMOCC	Symphoricarpos occidentalis	Western snowberry
F5000		11	SERIES: HABITAT: PHASE:	VACOCC	Vaccinium occidentale	Western bog huckleberry
F5010		11	SERIES: HABITAT: PHASE:	VACOCC CALCAN	Vaccinium occidentale Calamagrostis canadensis	Western bog huckleberry Bluejoint reedgrass
H2000		11	SERIES: HABITAT: PHASE:	CALCAN	Calamagrostis canadensis	Bluejoint reedgrass
H0100		11	SERIES: HABITAT: PHASE:	CARAQU	Carex aquatilis	Water sedge
H0200		11	SERIES: HABITAT: PHASE:	CARATO	Carex athrostachya	Slender beaked sedge
H0300		11	SERIES: HABITAT: PHASE:	CARBUX	Carex buxbaumii	Buxbaum's sedge
H6900			SERIES: HABITAT: PHASE:	CARFLA	Carex flava	Yellow sedge
H0400		11	SERIES: HABITAT: PHASE:	CARLAS	Carex lasiocarpa	Wooly sedge
H0410		11	SERIES: HABITAT: PHASE:	CARLAS POTGRM	Carex lasiocarpa Potamogeton gramineus	Wooly sedge Variable pondweed

LISTING OF ECOTYPE CODES

CODE	OTHER EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
H0500		11	SERIES: CARLIM HABITAT: PHASE:	Carex limosa	Mud sedge
H0600		11	SERIES: CARNEB HABITAT: PHASE:	Carex nebraskensis	Nebraska sedge
H0700		11	SERIES: CARROS HABITAT: PHASE:	Carex rostrata	Beaked sedge
H0710		11	SERIES: CARROS HABITAT: CARSCO PHASE:	Carex rostrata Carex scopulorum	Beaked sedge Rocky mountain sedge
H0730		11	SERIES: CARROS HABITAT: POTGRM PHASE:	Carex rostrata Potamogeton gramineus	Beaked sedge Variable pondweed
H0720		11	SERIES: CARROS HABITAT: POTPAL PHASE:	Carex rostrata Potentilla palustris	Beaked sedge Marsh cinquefoil
H0800		11	SERIES: CARSAA HABITAT: PHASE:	Carex saxatilis	Russet sedge
H0810		11	SERIES: CARSAA HABITAT: POTGRM PHASE:	Carex saxatilis Potamogeton gramineus	Russet sedge Variable pondweed
H7400			SERIES: CARSAR HABITAT: PHASE:	Carex sartwellii	Sartwell's sedge
H0900	L	11	SERIES: CARSCO HABITAT: PHASE:	Carex scopulorum	Rocky mountain sedge
H7000			SERIES: CARSIM HABITAT: PHASE:	Carex simulata	Analogue sedge
H2500	L	11	SERIES: DESCES HABITAT: PHASE:	Deschampsia cespitosa	Tufted hairgrass
H2510		09	SERIES: DESCES HABITAT: CAREXX PHASE:	Deschampsia cespitosa Carex spp.	Tufted hairgrass Sedge

LISTING OF ECOTYPE CODES

CODE	OTHER-EL	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
H3000		11	SERIES: DULARU HABITAT: PHASE:	Dulichium arundinaceum	Dulichium
H7500		11	SERIES: ELEPAL HABITAT: PHASE:	Eleocharis palustris	Creeping spike-rush
H3500		11	SERIES: ELEPAU HABITAT: PHASE:	Eleocharis pauciflora	Few-flowered spike-rush
H8000		11	SERIES: EQUARV HABITAT: PHASE:	Equisetum arvense	Common horsetail
H8500		11	SERIES: EQUFLU HABITAT: PHASE:	Equisetum fluviatile	Water horsetail
H4000		11	SERIES: GLYBOR HABITAT: PHASE:	Glycria borealis	Northern mannagrass
H4010		11	SERIES: GLYBOR HABITAT: ELEPAL PHASE:	Glycria borealis Eleocharis palustris	Northern mannagrass Creeping spike-rush
H4500		11	SERIES: JUNBAL HABITAT: PHASE:	Juncus balticus	Baltic rush
H9000		11	SERIES: MENARV HABITAT: PHASE:	Mentha arvensis	Field mint
H5000		11	SERIES: PHAARU HABITAT: PHASE:	Phalaris arundinacea	Reed canarygrass
H5500		11	SERIES: POAPAL HABITAT: PHASE:	Poa palustris	Fowl bluegrass
H5600		11	SERIES: POAPRA HABITAT: PHASE:	Poa pratenis	Kentucky bluegrass
H6000		11	SERIES: SCIACU HABITAT: PHASE:	Scirpus acutus	Hardstem bulrush

LISTING OF ECOTYPE CODES

CODE	OTHER IT	REFERENCES			SCIENTIFIC NAMES	COMMON NAMES
H7100			SERIES HABITAT PHASE	SCIAME	Scirpus americanus	Three square bulrush
H7200		20	SERIES HABITAT PHASE	SCIVAL	Scirpus validus	American great bulrush
H7300			SERIES HABITAT PHASE	TYPANG	Typha angustifolia	Lesser cat-tail
H6500		11	SERIES HABITAT PHASE	TYPLAT	Typha latifolia	Cattail
H6510		11	SERIES HABITAT PHASE	TYPLAT POTPAL	Typha latifolia Potentilla palustris	Cattail Marsh cinquefoil
J1200	W		SERIES HABITAT PHASE	ARTTST	Artemisia tridentata tridentata	Basin big sagebrush
J1240	M	04	SERIES HABITAT PHASE	ANTTST CARGEY	Artemisia tridentata tridentata Carex geyeri	Basin big sagebrush Elk sedge
J4100		08	SERIES HABITAT PHASE	SALBRA	Salix brachycarpa	Short-fruited willow
J4200		08	SERIES HABITAT PHASE	SALGLA	Salix glauca	Glaucus willow
J4300	F	08	SERIES HABITAT PHASE	SALPLA	Salix planifolia	Tealeaf willow
K0500			SERIES HABITAT PHASE	ANTLAN	Antennaria lanata	Woolly pussytoes
K1000			SERIES HABITAT PHASE	ANTMIC	Antennaria microphylla	Rosy pussytoes
K1010		14	SERIES HABITAT PHASE	ANTMIC ARTSCO	Antennaria microphylla Artemisia scopulorum	Rosy pussytoes Alpine sagewort

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LISTING OF ECOTYPE CODES

CODE	OTHER REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
K2500		SERIES: ERICOM HABITAT: PHASE:	Erigeron compositus	Fernleaf fleabane
K2510	14	SERIES: ERICOM HABITAT: POAXXX PHASE:	Erigeron compositus Poa spp.	Fernleaf fleabane Bluegrass
K3000		SERIES: GEUROS HABITAT: PHASE:	Geum rossii	Alpine avens
K3010	08	SERIES: GEUROS HABITAT: CARDRU PHASE:	Geum rossii Carex drummondiana	Alpine avens Drummond sedge
K3020	08	SERIES: GEUROS HABITAT: CARELV PHASE:	Geum rossii Carex elynoides	Alpine avens Blackroot sedge
K3030	14	SERIES: GEUROS HABITAT: TRINAN PHASE:	Geum rossii Trifolium nanum	Alpine avens Dwarf clover
K3040	14	SERIES: GEUROS HABITAT: TRIPAR PHASE:	Geum rossii Trifolium parryi	Alpine avens Parry clover
K4000		SERIES: PHLMUL HABITAT: PHASE:	Phlox multiflora	Flowery phlox
K4010	14	SERIES: PHLMUL HABITAT: TRINAN PHASE:	Phlox multiflora Trifolium nanum	Flowery phlox Dwarf clover
K4500		SERIES: PHLPUL HABITAT: PHASE:	Phlox pulvinata	Cushion phlox
K4510	14	SERIES: PHLPUL HABITAT: TRIDAS PHASE:	Phlox pulvinata Trifolium dasyphyllum	Cushion phlox whiproot clover
K4800	1327	SERIES: POLBIS HABITAT: PHASE:	Polygonum bistortoides	American bistort
K5000	04	SERIES: POLPHY HABITAT: PHASE:	Polygonum phytolaccaefolium	Alpine knotweed

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
K8000			SERIES: TRIDAS HABITAT: PHASE:	Trifolium dasyphyllum	Whiproot clover
K8010		14	SERIES: TRIDAS HABITAT: GEUROS PHASE:	Trifolium dasyphyllum Geum rossii	Whiproot clover Alpine avens
L1300		04	SERIES: CARGEY HABITAT: PHASE:	Carex geyeri	Elk sedge
L1000			SERIES: CARNIG HABITAT: PHASE:	Carex nigricans	Black alpine sedge
L1100			SERIES: CARRUP HABITAT PHASE:	Carex rupestris	Curley sedge
L1200			SERIES: CARSCI HABITAT: PHASE:	Carex scirpoides	Northern singlespike sedge
L0900	H		SERIES: CARSCO HABITAT PHASE:	Carex scopulorum	Rocky mountain sedge
L0910	H	08	SERIES: CARSCO HABITAT: ERICAL PHASE:	Carex scopulorum Eriophorum callitrix	Rocky mountain sedge Cottongrass Sedge
L2500	H		SERIES: DESCES HABITAT: PHASE:	Deschampsia cespitosa	Tufted hairgrass
L2510	H	08	SERIES: DESCES HABITAT: CARSCO PHASE:	Deschampsia cespitosa Carex scopulorum	Tufted hairgrass Rocky mountain sedge
L4500	N	04	SERIES: FESIDA HABITAT: PHASE:	Festuca idahoensis	Idaho fescue
L5000		23	SERIES: HESKIN HABITAT: PHASE:	Hesperochloa kingii	Spike-fescue
L7000			SERIES: KOBMYO HABITAT: PHASE:	Kobresia myosuroides	Bellard's Kobresia

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
M0200	F	07	SERIES: ALNSIN HABITAT: PHASE:	Alnus sinuata	Sitka alder
M0100			SERIES: ARTARB HABITAT: PHASE:	Artemisia arbuscula	Low sagebrush
M0110		09	SERIES: ARTARB HABITAT: AGRSPI PHASE:	Artemisia arbuscula Agropyron spicatum	Low sagebrush Bluebunch wheatgrass
M0111		09	SERIES: ARTARB HABITAT: AGRSPI PHASE: STICOM	Artemisia arbuscula Agropyron spicatum Stipa comata	Low sagebrush Bluebunch wheatgrass Needle-and-thread
M0120		09	SERIES: ARTARB HABITAT: FESIDA PHASE:	Artemisia arbuscula Festuca idahoensis	Low sagebrush Idaho fescue
M0300		07	SERIES: ARTCAN HABITAT: PHASE:	Artemisia cana	Silver sagebrush
M0310		0506	SERIES: ARTCAN HABITAT: AGRSMI PHASE:	Artemisia cana Agropyron smithii	Silver sagebrush Western wheatgrass
M0320		09	SERIES: ARTCAN HABITAT: FESIDA PHASE:	Artemisia cana Festuca idahoensis	Silver sagebrush Idaho fescue
M0500		09	SERIES: ARTLON HABITAT: PHASE:	Artemisia longiloba	Early low sagebrush
M0510		09	SERIES: ARTLON HABITAT: AGRSPI PHASE:	Artemisia longiloba Agropyron spicatum	Early low sagebrush Bluebunch wheatgrass
M0520		09	SERIES: ARTLON HABITAT: FESIDA PHASE:	Artemisia longiloba Festuca idahoensis	Early low sagebrush Idaho fescue
M0530			SERIES: ARTLON HABITAT: POASEC PHASE:	Artemisia longiloba Poa secunda	Early low sagebrush Sandberg bluegrass
M0700			SERIES: ARTPED HABITAT: PHASE:	Artemisia pedatifida	Birdfoot sagebrush

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CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
M0710		09	SERIES: ARTPED HABITAT: FESIDA PHASE:	Artemisia pedatifida Festuca idahoensis	Birdfoot sagebrush Idaho fescue
M1800			SERIES: ARTRIG HABITAT: PHASE:	Artemisia rigida	Stiff sagebrush
M1810		02	SERIES: ARTRIG HABITAT: POASEC PHASE:	Artemisia rigida Poa secunda	Stiff sagebrush Sandberg bluegrass
M1500			SERIES: ARTTRI HABITAT: PHASE:	Artemisia tridentata	Big sagebrush
M1510			SERIES: ARTTRI HABITAT: AGRSMI PHASE:	Artemisia tridentata Agropyron smithii	Big sagebrush Western wheatgrass
M1520			SERIES: ARTTRI HABITAT: AGRSPI PHASE:	Artemisia tridentata Agropyron spicatum	Big sagebrush Bluebunch wheatgrass
M1530			SERIES: ARTTRI HABITAT: ATRCON PHASE:	Artemisia tridentata Atriplex confertifolia	Big sagebrush Shadescale saltbrush
M1540			SERIES: ARTTRI HABITAT: BOUGRA PHASE:	Artemisia tridentata Bouteloua gradilis	Big sagebrush Blue grama
M1550			SERIES: ARTTRI HABITAT: CAREEY PHASE:	Artemisia tridentata Carex geyeri	Big sagebrush Elk sedge
M1560			SERIES: ARTTRI HABITAT: FESIDA PHASE:	Artemisia tridentata Festuca idahoensis	Big sagebrush Idaho fescue
M1561			SERIES: ARTTRI HABITAT: FESIDA PHASE: GERVIS	Artemisia tridentata Festuca idahoensis Geranium viscosissimum	Big sagebrush Idaho fescue Sticky geranium
M1570			SERIES: ARTTRI HABITAT: FESSCA PHASE:	Artemisia tridentata Festuca scabrella	Big sagebrush Rough fescue
M1571			SERIES: ARTTRI HABITAT: FESSCA PHASE: GERVIS	Artemisia tridentata Festuca scabrella Geranium viscosissimum	Big sagebrush Rough fescue Sticky geranium

LISTING OF ECOTYPE CODES

CODE	OTHER-EL	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
M1580			SERIES: ARTTRI HABITAT: POASEC PHASE:	Artemisia tridentata Poa secunda	Big sagebrush Sandberg bluegrass
M1590			SERIES: ARTTRI HABITAT: STICOM PHASE:	Artemisia tridentata Stipa comata	Big sagebrush Needle-and-thread
M1600			SERIES: ARTTRP HABITAT: PHASE:	Artemisia tripartita	Threetip sagebrush
M1610		02	SERIES: ARTTRP HABITAT: AGRSPI PHASE:	Artemisia tripartita Agropyron spicatum	Threetip sagebrush Bluebunch wheatgrass
M1620		09	SERIES: ARTTRP HABITAT: FESIDA PHASE:	Artemisia tripartita Festuca idahoensis	Threetip sagebrush Idaho fescue
M1000	J	0209	SERIES: ARTTST HABITAT: PHASE:	Artemisia tridentata tridentata	Basin big sagebrush
M1010		0209	SERIES: ARTTST HABITAT: AGRSPI PHASE:	Artemisia tridentata tridentata Agropyron spicatum	Basin big sagebrush Bluebunch wheatgrass
M1020		02	SERIES: ARTTST HABITAT: FESIDA PHASE:	Artemisia tridentata tridentata Festuca idahoensis	Basin big sagebrush Idaho fescue
M1030		02	SERIES: ARTTST HABITAT: POASEC PHASE:	Artemisia tridentata tridentata Poa secunda	Basin big sagebrush Sandberg bluegrass
M1040		02	SERIES: ARTTST HABITAT: STICOM PHASE:	Artemisia tridentata tridentata Stipa comata	Basin big sagebrush Needle-and-thread
M1200			SERIES: ARTTSV HABITAT: PHASE:	Artemisia tridentata vasevana	Mountain big sagebrush
M1210		09	SERIES: ARTTSV HABITAT: AGRSPI PHASE:	Artemisia tridentata vasevana Agropyron spicatum	Mountain big sagebrush Bluebunch wheatgrass
M1220		09	SERIES: ARTTSV HABITAT: FESIDA PHASE:	Artemisia tridentata vasevana Festuca idahoensis	Mountain big sagebrush Idaho fescue

LISTING OF ECOTYPE CODES

CODE	OTHER EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
M1221		09	SERIES: ARTTSV HABITAT: FESIDA PHASE: GERVIS	Artemisia tridentata vasevana Festuca idahoensis Geranium viscosissimum	Mountain big sagebrush Idaho fescue Sticky geranium
M1230		09	SERIES: ARTTSV HABITAT: FESSCA PHASE:	Artemisia tridentata vasevana Festuca scabrella	Mountain big sagebrush Rough fescue
M1400			SERIES: ARTTSW HABITAT: PHASE:	Artemisia tridentata wyomingensis	Wyoming big sagebrush
M1410		0906	SERIES: ARTTSW HABITAT: AGRSMI PHASE:	Artemisia tridentata wyomingensis Agropyron smithii	Wyoming big sagebrush Western wheatgrass
M1420		0906	SERIES: ARTTSW HABITAT: AGRSPI PHASE:	Artemisia tridentata wyomingensis Agropyron spicatum	Wyoming big sagebrush Bluebunch wheatgrass
M1430		07	SERIES: ARTTSW HABITAT: ATRCON PHASE:	Artemisia tridentata wyomingensis Atriplex confertifolia	Wyoming big sagebrush Shadescale saltbrush
M1440		07	SERIES: ARTTSW HABITAT: BOUGRA PHASE:	Artemisia tridentata wyomingensis Bouteloua gradilis	Wyoming big sagebrush Blue grama
M1450		09	SERIES: ARTTSW HABITAT: FESIDA PHASE:	Artemisia tridentata wyomingensis Festuca idahoensis	Wyoming big sagebrush Idaho fescue
M1460		09	SERIES: ARTTSW HABITAT: FESSCA PHASE:	Artemisia tridentata wyomingensis Festuca scabrella	Wyoming big sagebrush Rough fescue
M1461		07	SERIES: ARTTSW HABITAT: FESSCA PHASE: GERVIS	Artemisia tridentata wyomingensis Festuca scabrella Geranium viscosissimum	Wyoming big sagebrush Rough fescue Sticky geranium
M1470		02	SERIES: ARTTSW HABITAT: POASEC PHASE:	Artemisia tridentata wyomingensis Poa secunda	Wyoming big sagebrush Sandberg bluegrass
M1300			SERIES: ATRCON HABITAT: PHASE:	Atriplex confertifolia	Shadescale saltbrush
M2000			SERIES: CERLED HABITAT: PHASE:	Cercocarpus ledifolius	Curleaf mountain mahogany

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
M2010		09	SERIES: CERLED HABITAT: AGRSPI PHASE:	Cercocarpus ledifolius Agropyron spicatum	Curleaf mountain mahogany Bluebunch wheatgrass
M2100		13	SERIES: DRYINT HABITAT: PHASE:	Dryas integrifolia	White mountain-avens
M2300		13	SERIES: DRYOCT HABITAT: PHASE:	Dryas octopetala	White Dryas
M2500			SERIES: ERIMIC HABITAT: PHASE:	Eriogonum microthecum	Slenderbrush buckwheat
M2510		02	SERIES: ERIMIC HABITAT: PHYORE PHASE:	Eriogonum microthecum Physaria oregana	Slenderbrush buckwheat Oregon twinpod
M2700			SERIES: ERISPH HABITAT: PHASE:	Eriogonum sphaerocephalum	Rock buckwheat
M2710		02	SERIES: ERISPH HABITAT: POASEC PHASE:	Eriogonum sphaerocephalum Poa secunda	Rock buckwheat Sandberg bluegrass
M3000			SERIES: EURLAN HABITAT: PHASE:	Eurotia lanata	Common winterfat
M3010		02	SERIES: EURLAN HABITAT: POASEC PHASE:	Eurotia lanata Poa secunda	Common winterfat Sandberg bluegrass
M3500			SERIES: GRASPI HABITAT: PHASE:	Grayia spinosa	Spiny hopsage
M3520		02	SERIES: GRASPI HABITAT: POASEC PHASE:	Grayia spinosa Poa secunda	Spiny hopsage Sandberg bluegrass
M4000			SERIES: JUNCOM HABITAT: PHASE:	Juniperus communis	Common juniper
M4500			SERIES: JUNHOR HABITAT: PHASE:	Juniperus horizontalis	Creeping juniper

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
M4510		0507	SERIES: JUNHOR HABITAT: ANDSCO PHASE:	Juniperus horizontalis Andropogon scoparius	Creeping juniper Little bluestem
M4520		06	SERIES: JUNHOR HABITAT: CARHEL PHASE:	Juniperus horizontalis Carex heliophila	Creeping juniper Carex heliophila
M5200			SERIES: PHYMAL HABITAT: PHASE:	Physocarpus malvaceus	Ninebark
M5000	F		SERIES: POTFRU HABITAT: PHASE:	Potentilla fruticosa	Shrubby cinquefoil
M5010		07	SERIES: POTFRU HABITAT: ANDSCO PHASE:	Potentilla fruticosa Andropogon scoparius	Shrubby cinquefoil Little bluestem
M5020		09	SERIES: POTFRU HABITAT: FESIDA PHASE:	Potentilla fruticosa Festuca idahoensis	Shrubby cinquefoil Idaho fescue
M5030		09	SERIES: POTFRU HABITAT: FESSCA PHASE:	Potentilla fruticosa Festuca scabrella	Shrubby cinquefoil Rough fescue
M5031		09	SERIES: POTFRU HABITAT: FESSCA PHASE: DANINT	Potentilla fruticosa Festuca scabrella Danthonia intermedia	Shrubby cinquefoil Rough fescue Timber oatgrass
M5500			SERIES: PURTRI HABITAT: PHASE:	Purshia tridentata	Bitterbrush
M5510		0209	SERIES: PURTRI HABITAT: AGRSPI PHASE:	Purshia tridentata Agropyron spicatum	Bitterbrush Bluebunch wheatgrass
M5520		0209	SERIES: PURTRI HABITAT: FESIDA PHASE:	Purshia tridentata Festuca idahoensis	Bitterbrush Idaho fescue
M5530		0209	SERIES: PURTRI HABITAT: FESSCA PHASE:	Purshia tridentata Festuca scabrella	Bitterbrush Rough fescue
M5540		02	SERIES: PURTRI HABITAT: STICOM PHASE:	Purshia tridentata Stipa comata	Bitterbrush Needle-and-thread

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
M5800		32	SERIES: RHAALN HABITAT: PHASE:	Rhamnus alnifolia	Alder buckthorn
M6000			SERIES: RHUARO HABITAT: PHASE:	Rhus aromatica	Aromatic sumac
M6010		0609	SERIES: RHUARO HABITAT: AGRSPI PHASE:	Rhus aromatica Agropyron spicatum	Aromatic sumac Bluebunch wheatgrass
M6020		06	SERIES: RHUARO HABITAT: CARFIL PHASE:	Rhus aromatica Carex filifolia	Aromatic sumac Threadleaf sedge
M6030		0609	SERIES: RHUARO HABITAT: FESIDA PHASE:	Rhus aromatica Festuca idahoensis	Aromatic sumac Idaho fescue
M6500			SERIES: RHUGLA HABITAT: PHASE:	Rhus glabra	Smooth sumac
M6510		02	SERIES: RHUGLA HABITAT: AGRSPI PHASE:	Rhus glabra Agropyron spicatum	Smooth sumac Bluebunch wheatgrass
M6520		02	SERIES: RHUGLA HABITAT: ARILON PHASE:	Rhus glabra Aristida longiseta	Smooth sumac Red three-awn
M6530		02	SERIES: RHUGLA HABITAT: SPOCRY PHASE:	Rhus glabra Sporobolus cryptandrus	Smooth sumac Sand dropseed
M7500			SERIES: ROSNUT HABITAT: PHASE:	Rosa nutkana	Nootka rose
M7510		02	SERIES: ROSNUT HABITAT: FESIDA PHASE:	Rosa nutkana Festuca idahoensis	Nootka rose Idaho fescue
M7515		02	SERIES: ROSNUT HABITAT: FESIDA PHASE: ROSNUT	Rosa nutkana Festuca idahoensis Rosa nutkana	Nootka rose Idaho fescue Nootka rose
M7600		1729	SERIES: ROSWOO HABITAT: PHASE:	Rosa woodsii	Woods rose

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
M8000			SERIES: SARVER HABITAT: PHASE:	Sarcobatus vermiculatus	Black greasewood
M8010		0609	SERIES: SARVER HABITAT: AGRSMI PHASE:	Sarcobatus vermiculatus Agropyron smithii	Black greasewood Western wheatgrass
M8020		06	SERIES: SARVER HABITAT: AGRSPI PHASE:	Sarcobatus vermiculatus Agropyron spicatum	Black greasewood Bluebunch wheatgrass
M8030		07	SERIES: SARVER HABITAT: ARTTST PHASE:	Sarcobatus vermiculatus Artemisia tridentata tridentata	Black greasewood Basin big sagebrush
M8060			SERIES: SARVER HABITAT: ATRCON PHASE:	Sarcobatus vermiculatus Atriplex confertifolia	Black greasewood Shadescale saltbrush
M8040		0209	SERIES: SARVER HABITAT: DISSTR PHASE:	Sarcobatus vermiculatus Distichlis stricta	Black greasewood Inland saltgrass
M8050		09	SERIES: SARVER HABITAT: ELYCIN PHASE:	Sarcobatus vermiculatus Elymus cinereus	Black greasewood Great basin wild-rye
M8500			SERIES: SYMALB HABITAT: PHASE:	Symphoricarpos albus	Snowberry
M8510		0215	SERIES: SYMALB HABITAT: FESIDA PHASE:	Symphoricarpos albus Festuca idahoensis	Snowberry Idaho fescue
M8515		02	SERIES: SYMALB HABITAT: FESIDA PHASE: SYMALB	Symphoricarpos albus Festuca idahoensis Symphoricarpos albus	Snowberry Idaho fescue Snowberry
M9000		05	SERIES: SYMOCC HABITAT: PHASE:	Symphoricarpos occidentalis	Western snowberry
N0500			SERIES: AGRSMI HABITAT: PHASE:	Agropyron smithii	Western wheatgrass
N0510		07	SERIES: AGRSMI HABITAT: BOUGRA PHASE:	Agropyron smithii Bouteloua gracilis	Western wheatgrass Blue grama

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
N0520		0506	SERIES: AGRSMI HABITAT: CARFIL PHASE:	Agropyron smithii Carex filifolia	Western wheatgrass Threadleaf sedge
N0540		07	SERIES: AGRSMI HABITAT: STICOM PHASE:	Agropyron smithii Stipa comata	Western wheatgrass Needle-and-thread
N0530		07	SERIES: AGRSMI HABITAT: STIVIR PHASE:	Agropyron smithii Stipa viridula	Western wheatgrass Green needlegrass
N1000			SERIES: AGRSPI HABITAT: PHASE:	Agropyron spicatum	Bluebunch wheatgrass
N1010		09	SERIES: AGRSPI HABITAT: AGRSMI PHASE:	Agropyron spicatum Agropyron smithii	Bluebunch wheatgrass Western wheatgrass
N1011		09	SERIES: AGRSPI HABITAT: AGRSMI PHASE: STIVIR	Agropyron spicatum Agropyron smithii Stipa viridula	Bluebunch wheatgrass Western wheatgrass Green needlegrass
N1020		06	SERIES: AGRSPI HABITAT: BOUCUR PHASE:	Agropyron spicatum Bouteloua curtipendula	Bluebunch wheatgrass Side-oats grama
N1030		09	SERIES: AGRSPI HABITAT: BOUGRA PHASE:	Agropyron spicatum Bouteloua gracilis	Bluebunch wheatgrass Blue grama
N1031		09	SERIES: AGRSPI HABITAT: BOUGRA PHASE: LIAPUN	Agropyron spicatum Bouteloua gracilis Liatris punctata	Bluebunch wheatgrass Blue grama
N1040		06	SERIES: AGRSPI HABITAT: CARFIL PHASE:	Agropyron spicatum Carex filifolia	Bluebunch wheatgrass Threadleaf sedge
N1050		02	SERIES: AGRSPI HABITAT: FESIDA PHASE:	Agropyron spicatum Festuca idahoensis	Bluebunch wheatgrass Idaho fescue
N1060		15	SERIES: AGRSPI HABITAT: OPUPOL PHASE:	Agropyron spicatum Opuntia polyacantha	Bluebunch wheatgrass Starvation cactus
N1070		020915	SERIES: AGRSPI HABITAT: POASEC PHASE:	Agropyron spicatum Poa secunda	Bluebunch wheatgrass Sandberg bluegrass

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
N1071		09	SERIES: AGRSPI	Agropyron spicatum	Bluebunch wheatgrass
			HABITAT: POASEC	Poa secunda	Sandberg bluegrass
			PHASE: STICOM	Stipa comata	Needle-and-thread
N1080			SERIES: AGRSPI	Agropyron spicatum	Bluebunch wheatgrass
			HABITAT: STICOM	Stipa comata	Needle-and-thread
			PHASE:		
N1500		06	SERIES: ANDGER	Andropogon gerardii	Big bluestem
			HABITAT:		
			PHASE:		
N1510			SERIES: ANDGER	Andropogon gerardii	Big bluestem
			HABITAT: POACOM	Poa compressa	Canada bluegrass
			PHASE:		
N1700		07	SERIES: ANDHAL	Andropogon hallii	Sand bluestem
			HABITAT:		
			PHASE:		
N1710		07	SERIES: ANDHAL	Andropogon hallii	Sand bluestem
			HABITAT: CALLON	Calamovilfa longifolia	Prairie sandreed
			PHASE:		
N2000			SERIES: ANDSCO	Andropogon scoparius	Little bluestem
			HABITAT:		
			PHASE:		
N2010		0506	SERIES: ANDSCO	Andropogon scoparius	Little bluestem
			HABITAT: CARFIL	Carex filifolia	Threadleaf sedge
			PHASE:		
N2200		192021	SERIES: BOUGRA	Bouteloua gracilis	Blue grama
			HABITAT:		
			PHASE:		
N2500			SERIES: CALLON	Calamovilfa longifolia	Prairie sandreed
			HABITAT:		
			PHASE:		
N2510			SERIES: CALLON	Calamovilfa longifolia	Prairie sandreed
			HABITAT: ANDHAL	Andropogon hallii	Sand bluestem
			PHASE:		
N2520			SERIES: CALLON	Calamovilfa longifolia	Prairie sandreed
			HABITAT: CARFIL	Carex filifolia	Threadleaf sedge
			PHASE:		
N2530		06	SERIES: CALLON	Calamovilfa longifolia	Prairie sandreed
			HABITAT: CARHEL	Carex heliophila	Carex heliophila
			PHASE:		

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES			SCIENTIFIC NAMES	COMMON NAMES
N3500	L	04	SERIES: HABITAT: PHASE:	CARGEY	Carex geyeri	Elk sedge
N3500			SERIES: HABITAT: PHASE:	DISSPI	Distichlis spicata	Seashore saltgrass
N3510		07	SERIES: HABITAT: PHASE:	DISSPI PUCNUT	Distichlis spicata Puccinellia nuttalliana	Seashore saltgrass Nuttall alkali-grass
N4000			SERIES: HABITAT: PHASE:	ELYCIN	Elymus cinereus	Great basin wild-rye
N4010		09	SERIES: HABITAT: PHASE:	ELYCIN AGRSMI	Elymus cinereus Agropyron smithii	Great basin wild-rye Western wheatgrass
N4020		02	SERIES: HABITAT: PHASE:	ELYCIN DISSTR	Elymus cinereus Distichlis stricta	Great basin wild-rye Inland saltgrass
N4500	M		SERIES: HABITAT: PHASE:	FESIDA	Festuca idahoensis	Idaho fescue
N4510		09	SERIES: HABITAT: PHASE:	FESIDA AGRCAN	Festuca idahoensis Agropyron caninum	Idaho fescue Cutting wheatgrass
N4511		09	SERIES: HABITAT: PHASE:	FESIDA AGRCAN GERVIS	Festuca idahoensis Agropyron caninum Geranium viscosissimum	Idaho fescue Cutting wheatgrass Sticky geranium
N4520		09	SERIES: HABITAT: PHASE:	FESIDA AGRSMI	Festuca idahoensis Agropyron smithii	Idaho fescue Western wheatgrass
N4530		0915	SERIES: HABITAT: PHASE:	FESIDA AGRSPI	Festuca idahoensis Agropyron spicatum	Idaho fescue Bluebunch wheatgrass
N4531		09	SERIES: HABITAT: PHASE:	FESIDA AGRSPI STIOCC	Festuca idahoensis Agropyron spicatum Stipa occidentalis	Idaho fescue Bluebunch wheatgrass Western needlegrass
N4540		09	SERIES: HABITAT PHASE:	FESIDA CARFIL	Festuca idahoensis Carex filifolia	Idaho fescue Threadleaf sedge

LISTING OF ECOTYPE CODES

CODE	OTHER-EC	REFERENCES		SCIENTIFIC NAMES	COMMON NAMES
N4550		06	SERIES: FESIDA HABITAT: CARHEL PHASE:	Festuca idahoensis Carex heliophila	Idaho fescue Carex heliophila
N4560		09	SERIES: FESIDA HABITAT: CARSCI PHASE:	Festuca idahoensis Carex scirpoides	Idaho fescue Northern singlespike sedge
N4570		09	SERIES: FESIDA HABITAT: DESCES PHASE:	Festuca idahoensis Deschampsia cespitosa	Idaho fescue Tufted hairgrass
N4580		02	SERIES: FESIDA HABITAT: ERIHER PHASE:	Festuca idahoensis Eriogonum heracleoides	Idaho fescue Wyeth buckwheat
N4590		15	SERIES: FESIDA HABITAT: KOECRI PHASE:	Festuca idahoensis Koeleria cristata	Idaho fescue Junegrass
N4610		09	SERIES: FESIDA HABITAT: STIRIC PHASE:	Festuca idahoensis Stipa richardsonii	Idaho fescue Richardson needlegrass
N5000			SERIES: FESSCA HABITAT: PHASE:	Festuca scabrella	Rough fescue
N5010		09	SERIES: FESSCA HABITAT: AGRSPI PHASE:	Festuca scabrella Agropyron spicatum	Rough fescue Bluebunch wheatgrass
N5011		09	SERIES: FESSCA HABITAT: AGRSPI PHASE: STICOM	Festuca scabrella Agropyron spicatum Stipa comata	Rough fescue Bluebunch wheatgrass Needle-and-thread
N5020		09	SERIES: FESSCA HABITAT: FESIDA PHASE:	Festuca scabrella Festuca idahoensis	Rough fescue Idaho fescue
N5021		09	SERIES: FESSCA HABITAT: FESIDA PHASE: GERVIS	Festuca scabrella Festuca idahoensis Geranium viscosissimum	Rough fescue Idaho fescue Sticky geranium
N5022		09	SERIES: FESSCA HABITAT: FESIDA PHASE: STIRIC	Festuca scabrella Festuca idahoensis Stipa richardsonii	Rough fescue Idaho fescue Richardson needlegrass
N5200		2024	SERIES: PANVIR HABITAT: PHASE:	Panicum virgatum	Switchgrass

ECOSYSTEM CLASSIFICATION HANDBOOK

APPENDIX B

LISTING OF VASCULAR PLANT SPECIES WITH DUPLICATE ALPHA CODES AND SPECIAL CODES

Contents

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Special Alpha Codes Used in ECODATA Sampling	B--13

The following is a list of all duplicate, hybrid and special alpha-codes which appear in Standardized Plant Names and ECODATA Alpha-Codes of the USDA, Forest Service, Northern Region. The list is arranged first by state and then by flora.

Each plant species has a unique six-letter alpha-code. Such codes are comprised of the first three letters of the genus and the first three letters of the specific epithet. If a plant is only named to the genus level, use the first six letters of the genus. If the genus name has less than six letters (e.g., Poa spp.) an "X" is used to fill the remaining spaces (e.g., POAXXX).

Coding of plant species names does not follow the above convention when species share the same alpha-code or when a hybrid species is coded. Non-conforming plant species codes have been developed to accommodate these two situations.

If two species share the same alpha-code, the least common of the two species is denoted by one of the non-conforming plant species alpha-codes provided below. For example, Potentilla gracilis and Potamogeton gramineus share the first three letters for both genus and specific epithet. The least common of the two (P. gramineus) is given the duplicate alpha-code POTGRM. Non-conforming genera alpha-codes are also provided.

Non-conforming alpha-codes for hybrid plant species are denoted by an "X" preceding the specific epithet. For example, users of Hitchcock and Cronquist (1973) in Idaho will observe that Mentha piperita has been assigned the alpha-code, MENXPI.

To simplify use of the non-conforming alpha-code list provided, the user should highlight only those plant species which are most likely to be found in their study area. This will greatly reduce the number of non-conforming alpha-codes to be remembered.

The following is a listing of floras consulted in the development of Appendix B:

Dorn, R. D. 1984. Vascular plants of Montana. Mountain West Publishing. Cheyenne, WY. 276 pp.

Great Plains Association. 1986. Flora of the Great Plains. University Kansas Press, Lawrence, KS. 1392 pp.

Hitchock, C. L. and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press, Pullman, WA. 730 pp.

Stevens, O. A. 1950. Handbook of North Dakota Plants. North Dakota Agricultural College. 324 pp.

Van Bruggen, T. 1985. The vascular plants of South Dakota. Iowa State University Press, Ames, IA. 476 pp.

IDAHO

Non-conforming alpha codes to be used for select plant species and genera found in Hitchcock and Cronquist (1973).

Duplicate Genus Codes:

Centaurium spp	CENTAR
Chrysopsis spp	CHRYSP
Collinsia spp	COLLIS
Helianthella spp	HELIAT
Hymenopappus spp	HYMENP
Thelypteris spp	THELYT
Valerianella spp	VALERA

Duplicate Species Codes:

Agrostis spica-venti L	AGRSPV
Artemisia tridentata Nutt. spp. tridentata	ARTTST
Artemisia tridentata spp. vaseyana (Bydb.) Beetle	ARTTSV
Artemisia tridentata spp. wyomingensis Beetle & Young	ARTTSW
Aster alpigenus (Torr. & Gray) Gray	ASTALG
Aster bracteolatus Nutt.	ASTBRT
Astragalus caricinus (M. E. Jones) Barneby	ASTCAI
Astragalus chinensis L. f.	ASTCHN
Astragalus convallarius Greene	ASTCOV
Astragalus spaldingii Gray	ASTSPL
Cardamine breweri S. Wats.	CARBRW
Cardamine constancei Detling	CARCOS
Cardamine pensylvanica Muhl. ex Willd.	CARPES
Carex athrostachya Olney	CARATO
Carex crawfordii Fern.	CARCRW
Carex interrupta Boeckl.	CARINE
Carex laeviculmis Meinsh	CARLAV
Carex leporina L	CARLEO
Carex leporinella Mackenzie	CARLER
Carex leptopoda Mackenzie.	CARLET
Carex praeceptorum Mackenzie	CARPRC
Carex praticola Rydb	CARPRT
Carex rossii Boott	CARROI
Carex saxatilis L.	CARSAA
Carex scoparia Schkuht ex Willd.	CARSCP
Carex straminiformis Bailey.	CARSTA
Cirsium brevifolium Nutt	CIRBRV

Cirsium canovirens (Rydb.) Petrak.	CIRCAO
Collomia grandiflora Dougl. ex Lindl	COLGRN
Cryptantha flaccida (Dougl. ex Lehm.) Greene	CRYFLC
Cryptantha intermedia (Gray) Greene.	CRYINE
Delphinium glaucescens Rydb.	DELGLU
Epilobium glandulosum Lehm	EPIGLN
Erigeron annuus (L.) Pers.	ERIANS
Erigeron chrysopsidis Gray	ERICHS
Erigeron lanatus Hook.	ERILAA
Erigeron poliospermus Gray	ERIPOI
Eriogonum caespitosum Nutt	ERICAS
Eriogonum chrysops Rydb.	ERICHY
Eriogonum compositum Dougl. ex Benth	ERICOP
Eriogonum spergulinum Gray	ERISPR
Eriogonum strictum Benth	ERISTI
Eriophorum gracile W. D. J. Koch ex Roth	ERIGRC
Euphorbia maculata L	EUPMAU
Galium trifidum L.	GALTRF
Gentiana amarella L.	GENAMR
Gentiana detonsa Rottb	GENDEO
Gentiana prostrata Haenke.	GENPRS
Gentiana tenella Rottb	GENTEE
Gilia capitata Sims.	GILCAI
Haplopappus lanceolatus (Hook.) Torr. & Gray	HAPLAC
Helenium hoopesii Gray	HELHOP
Hieracium albertinum Farr.	HIEALE
Mimulus breviflorus Piper.	MIMBRV
Monotropa uniflora L	MONUNF
Montia dichotoma (Nutt.) T. J. Howell.	MONDIH
Montia linearis (Dougl. ex Hook.) Greene	MONLIE
Penstemon albertinus Greene.	PENALE
Penstemon cyananthus Hook.	PENCYN
Penstemon glandulosus Dougl. ex Lindl.	PENGLN
Phacelia glandulifera Piper.	PHAGLN
Poa gracillima Vasey	POAGRC
Polygonum confertiflorum Nutt. ex Piper.	POLCOF
Polygonum hydropiperoides Michx.	POLHYR
Potamogeton diversifolius Raf.	POTDIE
Potamogeton gramineus L.	POTGRM
Potentilla argentea L.	POTARE
Potentilla breweri Wats.	POTBRW
Ranunculus acriformis Gray	RANACI
Ranunculus uncinatus D. Don.	RANUNI
Rorippa curvisiliqua (Hook.) Bess. ex Britt.	RORCUV
Salix lasiolepis Benth	SALLAI
Scirpus Americanus Pers.	SCIAMR
Senecio pauperculus Michx.	SENPAP
Sphenosciadium capitellatum Gray	SPHCAI
Stellaria longifolia Muhl. ex Willd.	STELOG

Trientalis latifolia Hook. . . . . TRILAI
Trifolium microdon Hook. & Arn . . . . . TRIMIR
Veronica persica Poir. . . . . VERPES

Hybrids:

Betula x piperi (Britt.) Hitchc. (papyrifera x occidentalis). . . . . BETXPI
Mentha x piperita L. (aquatica x spicata) . . . . . MENXPI
Phyllodoce x intermedia (Hook.) Camp. (empetriformis x . . . . . glandulifera). . . .PHYXIN
Spiraea x pyramidata Greene (betulifolia spp. lucida x . . . . . .douglasii spp. menziesii) . .SPIXPY

MONTANA

Non-conforming alpha codes to be used for select plant species and genera found in Dorn (1984).

Duplicate Genus Codes:

Centaurium spp. . . . . CENTAR
Gentianella spp . . . . . GENTIN
Helianthella spp. . . . . HELIAT
Hymenopappus spp. . . . . HYMENP
Montiastrum spp . . . . . MONTIS
Sphaeromeria spp. . . . . SPHAEO
Thelypteris spp . . . . . THELYT

Duplicate Species Codes:

Agrostis interrupta L . . . . . AGRINE
Artemisia longiloba (Osterhout) Beetle. . . . . ARTLOL
Artemisia tridentata Nutt. spp. tridentata. . . . . ARTTST
Artemisia tridentata ssp. vaseyana (Rydb.) Beetle . . . . ARTTSV
Artemisia tridentata ssp. wyomingensis Beetle & Young . . ARTTSW
Artemisia tripartita Rydb . . . . . ARTTRP
Asplenium trichomanes-ramosum L . . . . . ASPTRR
Aster alpigenus (Torr. & Gray) Gray . . . . . ASTALG
Aster bracteolatus Nutt . . . . . ASTBRT
Aster canescens Pursh . . . . . ASTCAS
Astragalus falcatus Lam . . . . . ASTFAC
Astragalus grayi Parry ex S. Wats . . . . . ASTGRY
Astragalus missouriensis Nutt . . . . . ASTMIO
Astragalus plattensis Nutt. . . . . ASTPLE
Astragalus sericoleucus Gray. . . . . ASTSEO

Camissonia scapoidea (Nutt. ex Tort. & Gray) Raven.	CAMSCP
Cardamine breweri S. Wats	CARBRW
Cardamine pensylvanica Muhl. ex Willd	CARPES
Cardamine rupicola (Rydb.) C. L. Hitchc	CARRUI
Carex athrostachya Olney.	CARATO
Carex breweri Boott	CARBRR
Carex capitata L.	CARCAI
Carex concinna R. Br.	CARCOI
Carex crawfordii Fern	CARCRW
Carex eleusinoides Turcz. ex C. A. Mey.	CARELU
Carex laeviculmis Meihsh.	CARLAV
Carex microglochin Wahlenb.	CARMIR
Carex petricosa Dewey	CARPER
Carex praeceptorum Mackenzie.	CARPRC
Carex praticola Rydb.	CARPRT
Carex rossii Boott.	CARROI
Carex saxatilis L	CARSAA
Carex scoparia Schkuhr. ex Willd.	CARSCP
Carex stenoptila F. J. Herm	CARSTN
Carex straminiformis Bailey	CARSTA
Cirsium canovirens (Rydb.) Petrak	CIRCAO
Clematis columbiana (Nutt.) Torr. & Gray.	CLECOU
Collomia grandiflora Dougl. ex Lindl.	COLGRN
Cryptantha cana (A. Nels) Payson.	CRYCAA
Draba crassa Rydb	DRACRS
Erigeron flabellifolius Rydb.	ERIFLB
Erigeron flagellaris Gray	ERIFLG
Erigeron grandiflorus Hook.	ERIGRN
Erigeron lanatus Hook	ERILAA
Eriogonum caespitosum Nutt.	ERICAS
Eriogonum chrysops Rydb	ERICHY
Eriogonum strictum Benth.	ERISTI
Eriophorum gracile W. D. J. Kock ex Roth.	ERIGRC
Euphorbia serpens Kunth	EUPSEP
Galium trifidum L	GALTRF
Gentiana prostrata Haenke	GENPRS
Haplopappus lanceolatus (Hook.) Torr. & Gray.	HAPLAC
Hieracium albertinum Farr	HIEALE
Juncus compressus Jacq.	JUNCOP
Linanthus nuttallii (Gray) Greene ex Milliken	LINNUA
Lolium persicum Boiss. & Hohen. ex Boiss.	LOLPES
Monotropa uniflora L.	MONUNF
Penstemon albertinus Greene	PENALE
Penstemon cyananthus Hook	PENCYN
Physostegia virginiana (L.) Benth	PHYVIG
Poa gracillima Vasey.	POAGRC
Potamogeton diversifolius Raf	POTDIE
Potamogeton gramineus L	POTGRM
Potentilla argentea L	POTARE

Ranunculus acriformis Gray.	RANACI
Ranunculus uncinatus D. Don	RANUNI
Rorippa curvisiliqua (Hook.) Bess. ex Britt	RORCUV
Rumex acetosa L	RUMACT
Salix barrattiana Hook.	SALBAA
Salix monochroma Ball	SALMOO
Senecio cymbalaria Pursh.	SENCYB
Senecio pauperculus Michx	SENPAP
Solidago sparsiflora Gray	SOLSPR
Stellaria longifolia Muhl. ex Willd	STELOG
Vaccinium myrtilloides Michx.	VACMYT
Veronica persica Poir	VERPES

Hybrid:

Populus x acuminata Rydb. (angustifolia x deltoides)	POPXAC

Non-conforming alpha codes to be used for select plant species and genera found in Hitchcock and Cronquist (1973).

Duplicate Genus Codes:

Centaurium spp.	CENTAR
Chrysopsis spp.	CHRYSP
Helianthella spp.	HELIAT
Hymenopappus spp.	HYMENP

Duplicate Species Codes:

Agrostis interrupta L	AGRINE
Artemisia tridentata Nutt. ssp. tridentata.	ARTTST
Artemisia tridentata ssp. vaseyana (Rydb.) Beetle	ARTTSV
Artemisia tridentata ssp. wyomingensis Beetle & Young	ARTTSW
Artemisia tripartita Rydb	ARTTRP
Aster alpigenus (Torr. & Gray) Gray	ASTALG
Aster bracteolatus Nutt	ASTBRT
Astragalus convallarius Greene.	ASTCOV
Astragalus falcatus Lam	ASTFAC
Astragalus grayi Parry ex S. Wats	ASTGRY
Astragalus missouriensis Nutt	ASTMIO
Cardamine breweri S. Wats	CARBRW
Cardamine pensylvanica Muhl. ex Willd	CARPES
Cardamine rupicola (Rydb.) C. L. Hitchc	CARRUI
Carex athrostachya Olney.	CARATO
Carex breweri Boott	CARBRR
Carex capitata L.	CARCAI
Carex concinna R. Br.	CARCOI
Carex crawfordii Fern	CARCRW

Carex eleusinoides Turcz. ex C. A. Mey.	CARELU
Carex laeviculmis Meinsh.	CARLAV
Carex microglochin Wahlenb.	CARMIR
Carex praeceptorum Mackenzie.	CARPRC
Carex praticola Rydb.	CARPRT
Carex rossii Boott.	CARROI
Carex saxatilis L	CARSAA
Carex scoparia Schkuhr. ex Willd.	CARSCP
Carex straminiformis Bailey	CARSTA
Cirsium canovirens (Rydb.) Petrak	CIRCAO
Collomia grandiflora Dougl. ex Lindl.	COLGRN
Delphinium glaucescens Rydb	DELGLU
Draba crassa Rydb	DRACRS
Epilobium glandulosum Lehm.	EPIGLN
Erigeron flabellifolius Rydb.	ERIFLB
Erigeron flagellaris Gray	ERIFLG
Erigeron grandiflorus Hook.	ERIGRN
Erigeron lanatus Hook	ERILAA
Eriogonum caespitosum Nutt.	ERICAS
Eriogonum chrysops Rydb	ERICHY
Eriogonum strictum Benth.	ERISTI
Eriophorum gracile W. D. J. Koch ex Roth.	ERIGRC
Euphorbia maculata L.	EUPMAU
Galium trifidum L	GALTRF
Gentiana amarella L	GENAMR
Gentiana dentonsa Rottb	GENDEO
Gentiana propinqua Richards	GENPRP
Gentiana prostrata Haenke	GENPRS
Gentiana tenella Rottb.	GENTEE
Haplopappus lanceolatus (Hook) Torr. & Gray	HAPLAC
Hieracium albertinum Farr	HIEALE
Monotropa uniflora L.	MONUNF
Montia dichotoma (Nutt.) T. J. Howell	MONDIH
Montia linearis (Dougl. ex Hook.) Greene.	MONLIE
Penstemon albertinus Greene	PENALE
Penstemon cyananthus Hook	PENCYN
Poa gracillima Vasey.	POAGRC
Polygonum confertiflorum Nutt. ex Piper	POLCOF
Potamogeton diversifolius Raf	POTDIE
Potamogeton gramineus L	POTGRM
Potentilla argentea L	POTARE
Ranunculus acriformis Gray.	RANACI
Ranunculuc uncinatus D. Don	RANUNI
Rorippa curvisiliqua (Hook.) Bess. ex Britt	RORCUV
Rumex acetosa L	RUMACT
Salix barrattiana Hook.	SALBAA
Senecio pauperculus Michx	SENPAP
Stellaria longifolia Muhl. ex Willd	STELOG
Veronica persica Poir	VERPES

Hybrids:

Phyllodoce x intermedia (Hook.) Camp (empetriformis x glanduliflora)	PHYXIN
Populus x acuminata Rydb. (angustifolia x deltoides)	POPXAC

NORTH DAKOTA

Non-conforming alpha codes to be used for select plant species and genera found in Great Plains Association (1986)

Duplicate Genus Codes:

Chrysopsis spp	CHRYSP
Gentianopsis spp	GENTIO
Helianthella spp	HELIAT
Hymenopappus spp	HYMENP
Thelypteris spp.	THELYT

Duplicate Species Codes:

Aster canescens Pursh.	ASTCAS
Astragalus missouriensis Nutt.	ASTMIO
Astragalus plattensis Nutt	ASTPLE
Caltha palustris L	CALPAU
Cardamine pensylvanica Muhl. ex Willd.	CARPES
Carduus crispus L.	CARCRS
Carex athrostachya Olney	CARATO
Carex convoluta Mackenzie.	CARCOV
Carex granularis Muhl. ex Willd.	CARGRN
Carex haydenii Dewey	CARHAD
Carex prairea Dew.	CARPRR
Carex prarisa Dewey.	CARPRS
Carex pseudo-cyperus L	CARPSU
Carex rosea Schkuhr. ex Willd.	CARROE
Carex scirpiformis Mackenzie	CARSCR
Carex scoparia Schkuhr. ex Willd	CARSCP
Carthamus tinctorius L	CARTIC
Cuscuta epilinum Weihe	CUSEPL
Euphorbia maculata L	EUPMAU
Euphorbia serpens Kunth.	EUPSEP
Galium trifidum L.	GALTRF
Gentianopsis crinita (Froel.) MA	GENCRN
Gentianopsis procera (Holm) MA	GENPRE
Haplopappus lanceolatus (Hook.) Torr. & Gray	HAPLAC
Juncus brachycephalus (Engelm.) Buch	JUNBRC
Lolium persicum Boiss. & Hohen ex Boiss.	LOLPES
Monotropa uniflora L	MONUNF

Penstemon grandiflorus Nutt.	PENGRN
Polygonum hydropiperoides Michx.	POLHYR
Potamogeton gramineus L.	POTGRM
Potentilla argentea L.	POTARE
Ranunculus flabellaris Raf. ex Bigelow	RANFLB
Senecio pauperculus Michx	SENPAP
Senecio tridenticulatus Rydb	SENTRD
Stellaria longifolia Muhl. ex Willd	STELOG
Trillium cernuum L.	TRICEN
Tripterocalyx micranthus (Torr.) Hook	TRIMIA
Veronicastrum virginicum (L.) Farw.	VERVIG
Viola pratincola Greene	VIOPRT

Hybrids:

Apocynum x medium Greene (and. var incanum x cann. var hype.)	APOXME
Aster x amethystinus Nutt. (ericoidex x novae-angliae).	ASTXAM
Aster x sagittifolius Wedemeyer ex Willd. (ciliolatus x cordifolius).	ASTXSA
Cypripedium x andrewsii A.M. Fuller (candidum x parviflorum)	CYPXAN
Equisetum x ferrissii Clute (hyemale var affine x lacuigatum)	EQUXFE
Populus x acuminata Rydb. (angustifolia x deltoides)	POPXAC
Typha x glauca Godr. (angustifolia x latifolia).	TYPXGL

Non-conforming alpha codes to be used for select plant species and genera found in Stevens (1950).

Duplicate Genus Codes:

Chrysopsis spp	CHRYSP
Hymenopappus spp.	HYMENP

Duplicate Species Codes:

Agropyron albicans Scribn. & Smith.	AGRALI
Aster longifolius Lam	ASTLOG
Aster canescens Pursh	ASTCAS
Aster junceus Ait	ASTJUE
Aster longifolius Lam	ASTLOG
Astragalus missouriensis Nutt	ASTMIO
Astragalus plattensis Nutt.	ASTPLE
Caltha palustris L.	CALPAU
Cardamine pensylvanica Muhl. ex Willd	CARPES
Carduus crispus L	CARCRS
Carex athrostachya Olney.	CARATO

Carex granularis Muhl. ex Willd	CARGRN
Carex prairea Dew	CARPRR
Carex pseudo-cyperus L	CARPSU
Carex rosea Schkuhr. ex Willd	CARROE
Carex scirpiformis Mackenzie.	CARSCR
Carex scoparia Schkuhr ex Willd	CARSCP
Epilobium glandulosum Lehm	EPIGLN
Equisetum praealtum Raf	EQUPRE
Erigeron asper Nutt	ERIASE
Erigeron canadensis (L.) Cronq	ERICAA
Erigeron divaricatus Michx	ERIDIA
Euphorbia maculata L.	EUPMAU
Euphorbia serpens Kunth	EUPSEP
Galium trifidum L	GALTRF
Gentiana procera Holm	GENPRC
Gentiana puberula Michx	GENPUE
Juncus brachycephalus (Engelm.) Buch	JUNBRC
Monotropa uniflora L	MONUNF
Penstemon grandiflorus Nutt	PENGRN
Plagiobothrys scopulorum (Greene) I. M. Johnston	PLASCP
Potamogeton gramineus L	POTGRM
Potentilla argentea L	POTARE
Potentilla argyrea Rydb	POTARY
Scirpus paludosus A. Nels	SCIPAU
Senecio pauperculus Michx	SENPAP
Stellaria longifolia Muhl. ex Willd	STELOG
Trillium cernuum L	TRICEN
Veronicastrum virginicum (L.) Farw	VERVIG

Hybrid:

Aster x sagittifolius Wedemeyer ex Willd. (ciliolatus x cordifolius)	ASTXSA
Salvia x sylestris L. (nemorosa x pratensis)	SALXSY

SOUTH DAKOTA

Non-conforming alpha codes to be used for select plant species and genera found in Great Plains Association (1986) and Van Bruggen 1985.

Duplicate Genus Codes:

Chrysopsis spp.	CHRYSP
Helianthella spp.	HELIAT
Hymenopappus spp	HYMENP
Thelypteris spp	THELYT

Duplicate Species Codes:

Acer saccharinum L.	ACESAI
Antennaria parlinii Fern	ANTPAL
Arnica lonchophylla Greene	ARNLOC
Artemisia tridentata spp. vaseyana (Rydb.) Beetle	ARTTSV
Artemisia tridentata Nutt. spp. tridentata	ARTTST
Aster canescens Pursh	ASTCAS
Astragalus missouriensis Nutt	ASTMIO
Astragalus plattensis Nutt	ASTPLE
Astragalus sericoleucus Gray.	ASTSEO
Caltha palustris L	CALPAU
Cardamine concatenata (Michx.) O. E. Schulz	CARCOC
Cardamine pensylvanica Muhl. ex Willd	CARPES
Carex bella Baily	CARBEA
Carex concinna R. Br.	CARCOI
Carex convoluta Mackenzie	CARCOV
Carex granularis Muhl. ex Willd	CARGRN
Carex haydenii Dewey.	CARHAD
Carex intumescens Rudge	CARINU
Carex normalis Mackenzie	CARNOM
Carex prairea Dew	CARPRR
Carex prarisa Dewey	CARPRS
Carex praticola Rydb	CARPRT
Carex rosea Schkuhr ex Willd.	CARROE
Carex rossii Boott	CARROI
Carex scoparia Schkuhr ex Willd	CARSCP
Cryptantha cana (A. Nels.) Payson	CRYCAA
Elymus interruptus Buckl	ELYINE
Erigeron annuus (L.) Pers	ERIANS
Erigeron flagellaris Gray	ERIFLG
Eriophorum gracile W. D. J. Koch ex Roth	ERIGRC
Euphorbia maculata L	EUPMAU
Euphorbia serpens Kunth	EUPSEP
Galium trifidum L	GALTRF
Galeopsis bifida Boenn	GALBII
Gentianopsis procera (Holm) Ma	GENPRE
Penstemon grandiflorus Nutt	PENGRN
Physostegia virginiana (L.) Benth	PHYVIG
Polygonum hydropiperoides Michx	POLHYR
Potamogeton diversifolius Raf	POTDIE
Potamogeton gramineus L	POTGRM
Potentilla argentea L	POTARE
Ranunculus flabellaris Raf. ex Bigelow	RANFLB
Sanicula canadensis L	SANCAD
Senecio pauperculus Michx	SENPAP
Solidago sparsiflora Gray	SOLSPR
Stellaria longifolia Muhl. ex Willd	STELOG
Trillium cernuum L	TRICEN

Tripterocalyx micranthus (Torr.) Hook	TRIMIA
Veronica persica Poir	VERPES
Veronicastrum virginicum (L.) Farw	VERVIG
Viola pratincola Greene	VIOPRT

Hybrids:

Apocynum x medium Greene (and. var incanum x cann. var hype)	APOXME
Aster x amethystinus Nutt. (ericoides x novae-angliae)	ASTXAM
Aster x sagittifolius Wedemeyer ex Willd. (ciliolatus x cordifolius)	ASTXSA
Equisetum x ferrissii Clute (hyemale var. affine x laevigatum)	EQUXFE
Populus x acuminata Rydb. (angustifolia x deltoides)	POPXAC
Populus x brayshawii Boivin (angustifolia x balsamifera)	POPXBR
Typha x glauca Godr. (angustifolia x latifolia)	TYPXGL

The following is a listing of special alpha codes to be used in denoting select items in ECODATA sampling.

Special Codes

Plant Names

Fern	FERNXX
Forb	FORBXX
Forb annual	FORBAN
Forb perennial	FORBPE
Grass	GRASSX
Grass annual	GRASSA
Grass perennial	GRASSP
Lichen	LICHEN
Moss	MOSSXX
Shrub	SHRUBX
Tree broadleaf	TREEBR
Tree conifer	TREECO
Standing dead tree - unknown species	DEADTR
Standing dead tree - grand fir	DEADGF
Standing dead tree - subalpine fir	DEADAF
Standing dead tree - juniper	DEADJX
Standing dead tree - subalpine larch	DEADAL
Standing dead tree - western larch	DEADLX
Standing dead tree - Engelmann spruce (white spru.	DEADSX
Standing dead tree - whitebark pine	DEADWB
Standing dead tree - lodgepole pine	DEADLP

Standing dead tree - limber pine	DEADPF
Standing dead tree - western white pine	DEADWP
Standing dead tree - ponderosa pine	DEADPP
Standing dead tree - Douglas-fir	DEADDF
Standing dead tree - pacific yew	DEADYX
Standing dead tree - western redcedar	DEADCX
Standing dead tree - western hemlock	DEADWH
Standing dead tree - mountain hemlock	DEADMH
Standing dead tree - birch	DEADBX
Standing dead tree - green ash	DEADGA
Standing dead tree - cottonwood	DEADCW
Standing dead tree - aspen	DEADQA

Ground Cover Names

Basal vegetation	BASVEG
Gravel	GRAVEL
Litter	LITTER
Moss	MOSSXX
Other item	OTHERX
Rock	ROCKXX
Bare ground	BAREGR
Wood	WOODXX

Other Item Names

Bear dropping	BEAPIE
Cow dropping	COWPIE
Deer dropping	DEEPIE
Elk dropping	ELKPIE
Gopher cast	GOPCAS
Gopher mound	GOPMOU
Moose dropping	MOOPIE
Domestic sheep dropping	SHEPIE

ECOSYSTEM CLASSIFICATION HANDBOOK

APPENDIX C

ECODATA FIELD FORMS

USDA-Forest Service
RECON DATA — FORM 1

(FSH 2090.11, Chap. 4)

GENERAL ENVIRONMENTAL DATA

F1 KEY_ ID Fo D P Yr E SPol# F2 Examiner F3 E F5 Mo F6 Day F7 Project

F8 PLT F11 Quad or Photo - ID F15 Pl F18 WL _MUStrata F19 Tmbr Strata

F20 TCO TSC TStnd F21 Rnge Allot MU# EXT F22 Ra-Ty F23 Cap Area F25 Rep F26 GDA

F27 Po# F28 VT F29 % Po F32 E1 F33 PotTyp1 /SCT1 F34 E2 F35 PotTyp2 /SCT2 F36 SMU

F38 PM F40 Pol Pos F41 Shp F42 Asp F43 Slp F44 Elv F46 SSS F47 ErT

F50 Ground Cover S _ + G _ + R _ + L _ + W _ + M _ + BV _ + O _ = 100%
F51 SpFe F54 Str F55 VeC F56 TrC F60 ShC F64 GrC F65 FrC F71 HBC

F72 FLC F77 An1/An2 F78 GCD F79 Disturb 1 Disturb 2 Disturb 3

F80 Comments

PLANT SPECIES DATA F1 No_ Sp__

F2 L	3 Species 1	4 5 C I	F2 L	3 Species 2	4 5 C I	F2 L	3 Species 3	4 5 C I	F2 L	3 Species 4	4 5 C I
L	Species 5	C I	L	Species 6	C I	L	Species 7	C I	L	Species 8	C I
L	Species 9	C I	L	Species 10	C I	L	Species 11	C I	L	Species 12	C I

GENERAL ENVIRONMENTAL DATA

F1 KEY_ ID Fo D P Yr E SPol# F2 Examiner F3 E F5 Mo F6 Day F7 Project

F8 PLT F11 Quad or Photo - ID F15 Pl F18 WL _MUStrata F19 Tmbr Strata

F20 TCO TSC TStnd F21 Rnge Allot MU# EXT F22 Ra-Ty F23 Cap Area F25 Rep F26 GDA

F27 Po# F28 VT F29 % Po F32 E1 F33 PotTyp1 /SCT1 F34 E2 F35 PotTyp2 /SCT2 F36 SMU

F38 PM F40 Pol Pos F41 Shp F42 Asp F43 Slp F44 Elv F46 SSS F47 ErT

F50 Ground Cover S _ + G _ + R _ + L _ + W _ + M _ + BV _ + O _ = 100%
F51 SpFe F54 Str F55 VeC F56 TrC F60 ShC F64 GrC F65 FrC F71 HBC

F72 FLC F77 An1/An2 F78 GCD F79 Disturb 1 Disturb 2 Disturb 3

F80 Comments

PLANT SPECIES DATA F1 No_ Sp__

F2 L	3 Species 1	4 5 C I	F2 L	3 Species 2	4 5 C I	F2 L	3 Species 3	4 5 C I	F2 L	3 Species 4	4 5 C I
L	Species 5	C I	L	Species 6	C I	L	Species 7	C I	L	Species 8	C I
L	Species 9	C I	L	Species 10	C I	L	Species 11	C I	L	Species 12	C I

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FASTPLOT PLANT SPECIES DATA — FORM 2

(FSH 2090.11 Chap. 4)

F1 KEY_ ID _____ F2 No_ Sp __

FIELDS

3	4	5	6	3	4	5	6	3	4	5	6	3	4	5	6
L	Species 1	C	I	L	Species 2	C	I	L	Species 3	C	I	L	Species 4	C	I
L	Species 5	C	I	L	Species 6	C	I	L	Species 7	C	I	L	Species 8	C	I
L	Species 9	C	I	L	Species 10	C	I	L	Species 11	C	I	L	Species 12	C	I

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GENERAL PLOT DATA — FORM 3

(FSH 2090.11, Chap. 4)

IDENTIFICATION AND LOCATION

Fo D P Yr E Plt
F1 KEY_ ID __ _ _ __ _ ____ F2 Examiner _____ F3 EDIT _

Survey Mo Day Project # Plot Types PltRL Plot W
F4 ___ F5__ F6__ F7 _____ F8 3_____ F9 ___ F10 ___
F11 Quad _____ F12 Satellite (Date/ID) _____/_____
F13 Aerial Photo (Date/ID) _____/_____ F14 Spectral ___
F15 Pl _____ F16 Legal_ID ___T/___R/__S/_ 1/4 S/_ 1/4 of 1/4
F17 UTM _____N/_____E/___Z F18 WL_MUStrata _____
F19 Timber Strata _____ F20 TS_ ID: CO__ SC__ ST___ Plot __-__
F21 Range _____ Allot/ ___ MU/ __ Ext F22 Ra-Ty___ F23 Cap Area _____
F24 ComPlot _____ F25 Rep __ F26 GDA __ F27 Pol# __ F28 VT_
F29 % Po __ F30 Community Size (acres) ___ F31 Community Shape __

ENVIRONMENTAL FEATURES

F32 Eco Type (1) _ F33 Potential Natural Community (1) ____ Seral Type (1) __

F34 Eco Type (2) _ F35 Potential Natural Community (2) ____ Seral Type (2) __

F36 Soil Map Unit / Landtype Symbol _____ F37 Soil Taxon _____
F38 Parent Material __ F39 Geomorphic Landform __
F40 Plot Position _ F41 Slope Shape _ F42 Aspect ___ F43 Slope % ___
F44 Elevation _____ F45 Micro Climate _ F46 Soil Surface Status _
F47 Erosion Type _ F48 Erosion Depth ___ F49 % of Area Eroded __
F50 Ground Cover __S+__G+__R+__L+__W+__M+__BV+__O=100% F51 SpFe __

VEGETATION STRUCTURE AND PRODUCTION

BAF ___ * No Trees __ = F52 Basal Area ___ F53 DBH-Dom __ F54 Struc _ F55 Veg Change _
F56 Total Tree Cover _ F57 Pole(+) _ F58 Sapling _ F59 Seedling _
F60 Total Shrub Cover _ F61 Tall Shrub _ F62 Mid Shrub _ F63 Low Shrub _
F64 Total Graminoid Cover _ F65 Total Forb Cover _
F66 Mean Age of Dominant (> 10% canopy cover) Woody Species ____ years
F67 Mean Age of Oldest Woody Species (if different) ____ years

Production-herb + browse (DWF = dry weight factor expressed as a decimal)
Green wt gram _____ * __ DWF = F68 _____ lb / acre dry wt
Green wt forb _____ * __ DWF = F69 _____ lb / acre dry wt
Green wt shrub _____ * __ DWF = F70 _____ lb / acre dry wt
F71 Herb/browse production class _ F72 Fuel Loading Class __
F73 NFDRS Fuel Model __ F74 Duff Depth __ F75 Litter Depth __ F76 Fuel Depth __

ANIMAL USE AND DISTURBANCE HISTORY

F77 Animal Use _____ F78 Ground Cover Disturbance _
F79 Disturbance History (below)

DT	I	YR	S	DT	I	YR	S	DT	I	YR	S	DT	I	YR	S	DT	I	YR	S
__	_	__	_	__	_	__	_	__	_	__	_	__	_	__	_	__	_	__	_
__	_	__	_	__	_	__	_	__	_	__	_	__	_	__	_	__	_	__	_

F80 Comments on location, environment, structure, disturbance, etc. (up to 230 characters)

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FASTPLOT DATA — FORM 2 AND SHORTENED GENERAL PLOT DATA — FORM 3

(FSH 2090.11 Chap. 4)

SHORTENED GENERAL PLOT DATA

F1 KEY_ ID Fo D P Yr E SPol# F2 Examiner F3 E F5 Mo F6 Day F7 Project

F8 PLT F9 PltRL F10 PltW F11 Quad or Photo - ID F15 PI F18 WL Strata

23_

F19 Tmbr Strata F20 TCO TSC TStnd F21 Rnge Allot MU# EXT F22 Ra-Ty F23 Cap Area

F25 R F26 GDA F27 Po# F28 VT F29 % Po F32 E1 F33 PotTyp1 /SCT1 F34 E2 F35 PotTyp2 /SCT2

F36 SMU F38 PM F40 Pol Pos F41 Shp F42 Asp F43 Slp F44 Elevation F46 SSS F47 ErT

F50 Ground Cover S__+G__+R__+L__+W__+M__+BV__+O__= 100%

F51 SpFe F54 Str F55 VeC F56 TrC F60 ShC F64 GrC F65 FrC F71 HBC

F72 FLC F77 An1/An2 F78 GCD F79 Disturb 1 Disturb 2 Disturb 3

F80 Comments

FASTPLOT PLANT SPECIES DATA

F1 KEY_ ID F2 No_ Sp

F3 L	4 Species	5 C	6 I	F3 L	4 Species	5 C	6 I	F3 L	4 Species	5 C	6 I	F3 L	4 Species	5 C	6 I
L	Species 1	C	I	L	Species 2	C	I	L	Species 3	C	I	L	Species 4	C	I
L	Species 5	C	I	L	Species 6	C	I	L	Species 7	C	I	L	Species 8	C	I
L	Species 9	C	I	L	Species 10	C	I	L	Species 11	C	I	L	Species 12	C	I

SHORTENED GENERAL PLOT DATA

F1 KEY_ ID Fo D P Yr E SPol# F2 Examiner F3 E F5 Mo F6 Day F7 Project

F8 PLT F9 PltRL F10 PltW F11 Quad or Photo - ID F15 PI F18 WL Strata

23_

F19 Tmbr Strata F20 TCO TSC TStnd F21 Rnge Allot MU# EXT F22 Ra-Ty F23 Cap Area

F25 R F26 GDA F27 Po# F28 VT F29 % Po F32 E1 F33 PotTyp1 /SCT1 F34 E2 F35 PotTyp2 /SCT2

F36 SMU F38 PM F40 Pol Pos F41 Shp F42 Asp F43 Slp F44 Elevation F46 SSS F47 ErT

F50 Ground Cover S__+G__+R__+L__+W__+M__+BV__+O__= 100%

F51 SpFe F54 Str F55 VeC F56 TrC F60 ShC F64 GrC F65 FrC F71 HBC

F72 FLC F77 An1/An2 F78 GCD F79 Disturb 1 Disturb 2 Disturb 3

F80 Comments

FASTPLOT PLANT SPECIES DATA

F1 KEY_ ID F2 No_ Sp

F3 L	4 Species	5 C	6 I	F3 L	4 Species	5 C	6 I	F3 L	4 Species	5 C	6 I	F3 L	4 Species	5 C	6 I
L	Species 1	C	I	L	Species 2	C	I	L	Species 3	C	I	L	Species 4	C	I
L	Species 5	C	I	L	Species 6	C	I	L	Species 7	C	I	L	Species 8	C	I
L	Species 9	C	I	L	Species 10	C	I	L	Species 11	C	I	L	Species 12	C	I

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OCULAR PLANT SPECIES DATA — FORM 4

(FSH 2090.11, Chap. 4)

F1 KEY_ ID _____ F2 Number of Plant Species Recorded ___

	F3	F4	F5	F6	F7 Age/Size Class					F8			F9		
NO	LF	NAME	CC	MHT	1	2	3	4	5	DI	SF	PH	UT	IN	NOTES
1															
2															
3															
4															
5															
6															
7															
8															
9															
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COVER MICROPLOT PLANT SPECIES DATA — FORM 5

(FSH 2090.11 Chap 4)

F1 KEY_ ID _____ F2 Plot Size __ F3 No of Transects __
F4 No of Microplots ___ F5 No Species ___ Transect No __

GROUND COVER	MICROPLOTS 1	2	3	4	5	6	7	8	9	10	F6
BARE SOIL											SUM ___
GRAVEL											SUM ___
ROCK											SUM ___
MOSS											SUM ___
LITR/DUFF											SUM ___
BASAL VEG											SUM ___
WOOD											SUM ___
OTHER ITEM											SUM ___

PRODUCTION	MICROPLOTS 1	2	3	4	5	6	7	8	9	10	SUM GW DWF	F7 TOTAL DW
GRAMINOID												
FORB												
SHRUB												

PLANT SPECIES DATA

NO	F8 LF	F9 NAME	MICROPLOTS 1 C	2 C	3 C	4 C	5 C	6 C	7 C	8 C	9 C	10 C	F10 N	SUM FCC	F11 ACC	F12 MHT
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
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NESTED MICROPLOT PLANT SPECIES DATA — FORM 6

(FSH 2090.11, Chap. 4)

F1 KEY_ ID _____ F2 Plot Size _ F3 No of Transects _
F4 No of Microplots ___ F5 No Species ___ Transect No _

GROUND COVER	MICROPLOTS 1	2	3	4	5	6	7	8	9	10	F6
BARE SOIL											SUM
GRAVEL											SUM
ROCK											SUM
MOSS											SUM
LITR/DUFF											SUM
BASAL VEG											SUM
WOOD											SUM
OTHER ITEM											SUM

PRODUCTION	MICROPLOTS 1	2	3	4	5	6	7	8	9	10	SUM	GW	DWF	F7 TOTAL DW
GRAMINOID														
FORB														
SHRUB														

PLANT SPECIES DATA

NO	F8 LF	F9 NAME	MICROPLOTS 1 FC	2 FC	3 FC	4 FC	5 FC	6 FC	7 FC	8 FC	9 FC	10 FC	F10 SRF	SUM FCC	F11 ACC	F12 N	F13 MHT
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
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LINE INTERCEPT CANOPY COVER DATA — FORM 7

(FSH 2090.11, Chap. 4)

F1 KEY_ ID _____ F2 Transect Length (ft) ____
F3 No of Transects __ F4 No of Species ___ page ___ of ___

F5 SPECIES	F6 COVER DATA BY TRANSECT 1	2	3	4	5	6	7	F7 LF	F8 MHT
SPECIES	1	2	3	4	5	6	7	LF	MHT
SPECIES	1	2	3	4	5	6	7	LF	MHT
SPECIES	1	2	3	4	5	6	7	LF	MHT
SPECIES	1	2	3	4	5	6	7	LF	MHT
SPECIES	1	2	3	4	5	6	7	LF	MHT
SPECIES	1	2	3	4	5	6	7	LF	MHT
SPECIES	1	2	3	4	5	6	7	LF	MHT
SPECIES	1	2	3	4	5	6	7	LF	MHT

RECORD COVER IN INCHES

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DENSITY DATA — FORM 8

(FSH 2090.11, Chap. 4)

F1 KEY_ ID _____ F2 Transect Length (ft) ____
F3 No of Transects __ F4 No of Items ___ page ___ of ___

F5 ITEM NAME / AGE	F6 TS	F7 WIDTH	F8 DENSITY DATA BY TRANSECT 1	2	3	4	5	6	7
ITEM NAME / AGE	TS	WIDTH	1	2	3	4	5	6	7
ITEM NAME / AGE	TS	WIDTH	1	2	3	4	5	6	7
ITEM NAME / AGE	TS	WIDTH	1	2	3	4	5	6	7
ITEM NAME / AGE	TS	WIDTH	1	2	3	4	5	6	7
ITEM NAME / AGE	TS	WIDTH	1	2	3	4	5	6	7
ITEM NAME / AGE	TS	WIDTH	1	2	3	4	5	6	7
ITEM NAME / AGE	TS	WIDTH	1	2	3	4	5	6	7
ITEM NAME / AGE	TS	WIDTH	1	2	3	4	5	6	7

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PRODUCTION DATA — FORM 9

(FSH 2090.11, Chap. 4,

F1 KEY_ ID _____ F2 Number of Plots ___ F3 Plots/Transect ___
F4 Plot Size (to 0.1 sq. ft.) ___.__ F5 No. of Items ___ page ___ of ___

F7 = DW (DRY WEIGHT PRODUCTION IN GRAMS BY PLOT NUMBER)

F6 ITEM	GW	DWF	DW	GW	DWF	DW	GW	DWF	DW	GW	DWF	DW	GW	DWF	DW
		1			2			3			4			5	
		6			7			8			9			10	
		11			12			13			14			15	
		16			17			18			19			20	

ITEM	GW	DWF	DW	GW	DWF	DW	GW	DWF	DW	GW	DWF	DW	GW	DWF	DW
		1			2			3			4			5	
		6			7			8			9			10	
		11			12			13			14			15	
		16			17			18			19			20	

ITEM	GW	DWF	DW	GW	DWF	DW	GW	DWF	DW	GW	DWF	DW	GW	DWF	DW
		1			2			3			4			5	
		6			7			8			9			10	
		11			12			13			14			15	
		16			17			18			19			20	

ITEM	GW	DWF	DW	GW	DWF	DW	GW	DWF	DW	GW	DWF	DW	GW	DWF	DW
		1			2			3			4			5	
		6			7			8			9			10	
		11			12			13			14			15	
		16			17			18			19			20	

ITEM	GW	DWF	DW	GW	DWF	DW	GW	DWF	DW	GW	DWF	DW	GW	DWF	DW
		1			2			3			4			5	
		6			7			8			9			10	
		11			12			13			14			15	
		16			17			18			19			20	

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SHORT NESTED MICROPLOT PLANT SPECIES DATA — FORM A (FSH 2090.11, Chap. 4)

F1 KEY_ ID _____ F2 Plot Size __ F3 No of Transects __
F4 No of Microplots ___ F5 No Species ___ Transect No __

GROUND COVER	MICROPLOTS 1	2	3	4	5	6	7	8	9	10	F6
BARE SOIL											SUM ___
GRAVEL											SUM ___
ROCK											SUM ___
MOSS											SUM ___
LITR/DUFF											SUM ___
BASAL VEG											SUM ___
WOOD											SUM ___
OTHER ITEM											SUM ___

PRODUCTION	MICROPLOTS 1	2	3	4	5	6	7	8	9	10	SUM GW	DWF	F7 TOTAL DW
GRAMINOID													
FORB													
SHRUB													

PLANT SPECIES DATA			MICROPLOTS										F10	SUM	F11	F12	F13
F8 NO	F8 LF	F9 NAME	1 FC	2 FC	3 FC	4 FC	5 FC	6 FC	7 FC	8 FC	9 FC	10 FC	SRF	FCC	ACC	N	MHT
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
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12																	

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POINT COVER DATA — FORM B

(FSH 2090.11, Chap. 4)

F1 KEY_ ID _____ F2 Transect Length (ft)____

F3 No of Transects __ F4 No of Items ___ page ___ of ___

F5 ITEM	F6 TNP/T	F7 POINT COVER DATA BY TRANSECT 1	2	3	4	5	6	7
ITEM	TNP/T	1	2	3	4	5	6	7
ITEM	TNP/T	1	2	3	4	5	6	7
ITEM	TNP/T	1	2	3	4	5	6	7
ITEM	TNP/T	1	2	3	4	5	6	7
ITEM	TNP/T	1	2	3	4	5	6	7
ITEM	TNP/T	1	2	3	4	5	6	7
ITEM	TNP/T	1	2	3	4	5	6	7
ITEM	TNP/T	1	2	3	4	5	6	7
ITEM	TNP/T	1	2	3	4	5	6	7
ITEM	TNP/T	1	2	3	4	5	6	7

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OPTIONAL PLANT SPECIES ATTRIBUTE DATA — FORM C

(FSH 2090.11, Chap. 4)

F1 KEY_ ID _____ F2 Number of Plant Species Recorded ___

	F3	F4	F5 Age/Size Class					F6			F7		
NO	LF	NAME	1	2	3	4	5	DI	SF	PH	UT	IN	NOTES
1	_	_____	_	_	_	_	_	_	_	_	_	_	_____
2	_	_____	_	_	_	_	_	_	_	_	_	_	_____
3	_	_____	_	_	_	_	_	_	_	_	_	_	_____
4	_	_____	_	_	_	_	_	_	_	_	_	_	_____
5	_	_____	_	_	_	_	_	_	_	_	_	_	_____
6	_	_____	_	_	_	_	_	_	_	_	_	_	_____
7	_	_____	_	_	_	_	_	_	_	_	_	_	_____
8	_	_____	_	_	_	_	_	_	_	_	_	_	_____
9	_	_____	_	_	_	_	_	_	_	_	_	_	_____
10	_	_____	_	_	_	_	_	_	_	_	_	_	_____
11	_	_____	_	_	_	_	_	_	_	_	_	_	_____
12	_	_____	_	_	_	_	_	_	_	_	_	_	_____
13	_	_____	_	_	_	_	_	_	_	_	_	_	_____
14	_	_____	_	_	_	_	_	_	_	_	_	_	_____
15	_	_____	_	_	_	_	_	_	_	_	_	_	_____
16	_	_____	_	_	_	_	_	_	_	_	_	_	_____
17	_	_____	_	_	_	_	_	_	_	_	_	_	_____
18	_	_____	_	_	_	_	_	_	_	_	_	_	_____
19	_	_____	_	_	_	_	_	_	_	_	_	_	_____
20	_	_____	_	_	_	_	_	_	_	_	_	_	_____

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ECOSYSTEM CLASSIFICATION HANDBOOK

APPENDIX D

LISTING OF FIELD EQUIPMENT NEEDS FOR DIFFERENT SAMPLING METHODS

The Following is a Listing of Field Equipment Needs for the Basic Sampling Methods of ECODATA

	RECON	RAPIDPLOT	OCULAR	COVER MICROPLOT	NESTED MICROPLOT
Aerial photos when available	Req	Req	Req	Req	Req
Altimeter	Opt	Opt	Opt	Opt	Opt
Auger, soil	Opt	Opt	Opt	Opt	Opt
Axe (hatchet)	Opt	Opt	Opt	Opt	Opt
Bag, for clip/weigh	Opt	Opt	Opt	Opt	Opt
Basal area gauge	Opt	Opt	Opt	Opt	Opt
Binoculars	Opt	Opt	Opt	Opt	Opt
Camera	Opt	Opt	Opt	Opt	Opt
Chaining pins (10)	Opt	Opt	Opt	Req	Req
Clinometer	Req	Req	Req	Req	Req
Compass	Req	Req	Req	Req	Req
Diameter tap	Opt	Opt	Opt	Opt	Opt
Flagging	Opt	Opt	Opt	Opt	Opt
Field handbook	Req	Req	Req	Req	Req
Forms, water proof	Req	Req	Req	Req	Req
Go no-go gauge 0-1/4; 1/4-1; 1-3	Opt	Opt	Opt	Opt	Opt
Habitat type keys	Req	Req	Req	Req	Req
Hammer, rock	Opt	Opt	Opt	Opt	Opt
Hand lens	Req	Req	Req	Req	Req
Hydrochloric acid	Opt	Opt	Opt	Opt	Opt
Increment borer	Opt	Opt	Opt	Opt	Opt
Knife or clippers	Opt	Opt	Opt	Opt	Opt
Map, 7.5' quad	Req	Req	Req	Req	Req
Microplot	Opt	Opt	Opt	Req	Req
Pencil	Req	Req	Req	Req	Req
Permanent plot stakes	Opt	Opt	Opt	Opt	Req
Plant collecting equipment	Req	Req	Req	Req	Req

Req = Required
Opt = Optional

	RECON	RAPIDPLOT	OCULAR	COVER MICROPLOT	NESTED MICROPLOT
Plant key	Req	Req	Req	Req	Req
Range pole	Opt	Opt	Opt	Opt	Opt
Relascope	Opt	Opt	Opt	Opt	Opt
Scale, grams	Opt	Opt	Opt	Opt	Opt
Shovel	Opt	Opt	Opt	Opt	Opt
Soil color chart	Opt	Opt	Opt	Opt	Opt
Stereoscope	Req	Req	Req	Req	Req
Tape, 10 feet	Req	Req	Req	Req	Req
Tape, 66+feet	Opt	Opt	Req	Req	Req
Tatum	Req	Req	Req	Req	Req

Req = Required
Opt = Optional

ECOSYSTEM CLASSIFICATION HANDBOOK

APPENDIX E

GLOSSARY OF TERMS

Basal vegetation - the percent of ground surface occupied by live plant stems or root crowns.

Baseline - the line marking the lower side of a square or rectangular macroplot. Starting points for transects occur along this line.

Canopy cover, absolute - the percent of horizontal area covered by the vertical downward projection of a plant species foliage area.

Canopy cover, relative - the absolute canopy cover of a species or life form divided by the sum of all species times 100.

Clumped distribution - a pattern of distribution where individuals of a plant species occurs in a group.

Community type - all the communities in which the dominant and/or indicator species, or one or more of a group of indicator species, of corresponding layers are the same.

Constancy - the number of macroplots a species occurs in, at a specified level of cover or frequency, divided by the total number of macroplots in the class or type being described.

Cover type - all of the stands in which one or a group of dominant species are similar.

Dominant species - those species in a stand that in comparison to other species have the greatest volume.

Dozer pile/burn - a site preparation treatment for fuels management and regeneration that utilizes a dozer to push slash into piles or windrows, which are in turn burned.

Dry weight - weight of plant material that has been air-dried, at 70 degrees farenheit or more, for at least 24 hours.

Duff - organic matter from plant leaf, stem and limb fall that is on the soil surface and has decayed to the point that the original tissue cannot be identified.

Ecological type - all of the land that has the potential to develop one kind of potential or climax community type and occurs on one site type.

Ecosytem type - all the land that has potential to support a similar structural life form and has similar broad environmental characteristics.

Ecotone - a broad or narrow zone, patchy or fingered, which separates two vegetation types.

Fern - nonflowering vascular plant that reproduces with spores. This category also includes Lycopodium spp. and Selaginella spp.

Forb - flowering vascular plant that is not a grass, sedge or rush.

Frequency - the number of microplots a species occurs in divided by the total number of microplots for the sample.

Geographic description area (GDA) - an area delineated on a map or aerial photo that is large enough to contain most of the vegetation and site conditions for the total area that is being mapped or described.

Gravel - rock fragments between 1/16 and 3 inches in diameter.

Green weight - the weight of plant material before drying.

Grizzly bear components - mapping strata for grizzly bear habitat surveys.

Gully erosion - removal of soil by running water forming a channel that is greater than 6 inches deep.

Habitat type - all of the land that has the potential to develop one kind of potential or climax community type.

Hedging - lateral branching on shrubs caused by browsing from big game or livestock.

Height of upper layer - the height, to the closest foot, of the majority of the volume for the species or life form.

Inclusion - a vegetation type within a polygon that, as a sum of its discrete units, makes up less than 20 percent of the stand.

Indicator species - those plant species that have been correlated with specific environmental (site or disturbance) conditions or consistently occur in a community type.

Inflorescense - the flowering portion of a plant.

Jackpot burn - an area where a pile of slash has been burned.

LANDSAT - a satellite image of five bands that is scanned for spectral reflectance values. These values are then grouped into spectral classes. Classes are correlated with various vegetation cover types.

Layer - a layer of vegetation relative to height and structural characteristics.

Litter - organic matter from leaf, stem and branch fall that is on the soil surface and the original tissue can be identified.

Macroplot - a relatively large plot of specified size and shape within which vegetation and site attributes are described.

Mean height - the average height of the upper layer of a species or life form.

Moss - nonvascular plant that reproduces with spores.

Pavement - gravel that has been exposed by erosion of fine materials and forms a matrix on the soil surface.

Phenology - the stage of annual plant growth related to seasonal development.

Pixel - the smallest unit of land recorded by a satellite image for scanning of spectral reflectance.

Polygon - a unit of land with relatively uniform vegetation and site conditions, for the scale of mapping, that is delineated on a map or aerial photo within a closed boundary. Due to the scale of mapping, vegetation and site conditions within a polygon may not be taxonomically pure. In such cases, a polygon may contain a complex or set of inclusions of different vegetation and site types.

Production - the increase of foliage or stem biomass over a period of a year or growing season.

Randomly distributed - there is no regular or grouped pattern in the distribution of individuals of a plant species.

Regular distribution - individuals of a plant species occur in an even distribution.

Rill erosion - channels less than 6 inches deep where soil has been removed by running water.

Rock - rock fragments greater than 3 inches in diameter.

Rotten log - a log that has decayed to the extent that it can be kicked apart.

Shade cards - cards that are placed vertically adjacent to planted trees to provide shade from sunlight.

Sheet erosion - areas of land where soil has been eroded by water in a sheet instead of a channel.

Shrub form class - the class of hedging intensity.

Shrub - a woody plant usually less than 15 feet high when mature. This includes subshrubs, i.e., those less than 6 inches in height.

Site type - all of the sites that have similar soil, parent material, position and shape, aspect, elevation, slope and climate. These sites are predicted to produce one kind of climax or potential plant community type.

Sound log - a log that has not decayed to the extent that it can be kicked apart.

Stand - a type of polygon which is usually delineated on a 1:2400 map base.

Strata - the total area of land that fits within one class of a classification.

Structure - the type, size and arrangement of the vegetation on a site. Structure is typically classified into herbaceous, shrub, sapling trees, pole size trees, etc., based on the size of the largest vegetation life form. The classification may also be based on multiple layers.

Transect - a line without area, or a strip with area, that is located to count or measure specific attributes.

Tree - a woody plant usually greater than 15 feet high when mature.

Utilization class - classes used for estimation of the amount of plant vegetation that has been grazed by livestock or big game animals.

Vegetation type - all the plant communities that are relatively similar in both plant species type and amount for all layers.

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APPENDIX F

LITERATURE REFERENCES

American Geological Institute. 1962. Dictionary of geological terms. Dolphin Books, Garden City, New York, NY. 546 p.

Arno, S. F.; D. G. Simmerman; R. E. Keane. 1985. Forest succession on four habitat types in western Montana. GTR INT-177. USDA, Forest Service, Intermountain Forest and Range Exp. Sta., Ogden, UT. 74 p.

Barbour, M. G.; J. H. Burk; W. D. Pitts. 1980. Terrestrial plant ecology. The Benjamin/Cummings Publishing Company, Inc., Menlo Park, CA. 604 p.

Brown, E. R. 1985. Management of wildlife and fish habitats in forests of western Oregon and Washington. E. R. Brown, Technical Editor. USDA, Forest Service, Pacific Northwest Region, Portland, OR. 332 p.

Burnham, K. P.; D. R. Anderson; J. L. Laake. 1985. Efficiency and bias in strip and line transect sampling. Journal of Wildlife Management. 49(4):1012-1018.

Burnham, K. P.; D. R. Anderson; J. L. Laake. 1980. Estimation of density from line transect sampling of biological populations. Wildlife Monographs, No. 72. 202 p.

Carande, V.; D. A. Jameson. 1986. Combination of weight estimates with clipped sample data. Journal of Range Management 39(1):88-89.

Daniel, T. W.; J. A. Helms; F. S. Baker. 1979. Principles of silviculture. 2nd edition. McGraw-Hill Book Company, New York, NY. 500 p.

Daniel, W. W. 1978. Applied nonparametric statistics. Houghton Mifflin Co. Boston, MA. 507 p.

Daubenmire, R. 1952. Forest vegetation of northern Idaho and adjacent Washington, and its bearing on concepts of vegetation classification. Ecological Monograph. 22: 301-320.

Daubenmire, R. 1978. Plant geography. Academic Press, New York, NY. 338 p.

Daubenmire, R. 1968. Plant communities, a textbook of plant synecology. Harper & Row Publishers, New York, NY. 300 p.

Ford-Roberston, F. C. 1971. Terminology of forest science, technology, practice and products. Society of American Foresters, Washington, DC. 349 p.

Husch, B.; C. I. Miller; T. W. Beers. 1972. Forest mensuration. 2nd edition. John Wiley & Sons, New York, NY. 410 p.

Lund, H. G. 1986. A primer on integrating resource inventories. USDA, Forest Service, GTR WO-49. 64 p.

Miles, J. 1979. Vegetation dynamics. Chapman and Hall, John Wiley & Sons, New York, NY. 80 p.

Mueller-Dombois, D.; H. Ellenberg. 1974. Aims and methods of vegetation ecology. John Wiley & Sons, New York, NY. 547 p.

Pfister, R.D.; S.F. Arno. 1980. Classifying forest habitat types based on potential climax vegetation. USDA, Forest Service, Intermountain Forest and Range Exp. Sta., Ogden, UT. 26: 52-70.

Range Inventory Standardization Committee. 1983. Guidelines and terminology for range inventories and monitoring. Society for Range Management, Denver, CO. 13 p.

Smith, S. D. 1982. Evaluation of the frequency plot method as an improved technique for measuring successional trend. Master of Science thesis. University of Idaho, Moscow, ID. 54-95.

Spurr, S. H.; B. V. Barnes. Forest Ecology. 3rd edition. John Wiley & Sons, New York, NY. 687 p.

Steel, R. G. D.; J. H. Torrie. 1960. Principles and procedures of statistics--with special reference to the biological sciences. McGraw-Hill Book Co., Inc., New York, NY. 481 p.

Thomas, J. W. 1979. Wildlife habitats in managed forests - the Blue Mountains of Oregon and Washington. Agric. Handbook No. 553. USDA, Forest Service, Pacific Northwest Forest and Range Exp. Sta., Portland, OR. 512 p.

USDA, Forest Service, Northern Region. 1987. Timber management data handbook. Forest Service Handbook 2409.21h R-1. USDA, Forest Service, Northern Region, Timber Management Staff Group. Missoula, MT.

USDA, Forest Service, Northern Region. 1987. Timber management control handbook. Forest Service Handbook 2409.21e R-1. USDA, Forest Service, Northern Region, Timber Management Staff Group. Missoula, MT.

USDA, Forest Service, Washington Office. 1986. Draft resource inventory handbook. Draft Forest Service Handbook 1909.X3. USDA, Forest Service, Washington Office. Washington, DC.

White, J. S. 1985. Evaluation of nested quadrat frequency for the detection of vegetational change on transitory range. Master of Science thesis, University of Idaho, Moscow, ID. 93 p.

Wright, H. A.; A. W. Bailey. 1982. Fire ecology--United States and southern Canada. John Wiley & Sons. New York, NY. 501 p.

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APPENDIX G

MICROPLOT FRAME CONSTRUCTION AND USE

Microplot Construction

Various types of materials are suitable for plot frame construction. Lightweight, but sturdy, metal or plastic tubing and rods are desirable. Large diameter materials should be avoided since they create greater error in estimates of cover and nested frequency than small diameter materials. The following is a listing of frame dimensions and color coding conventions to be followed in the construction of a microplot.

Microplot frame type A is a 10 x 20-inch rectangular, open ended, plot frame. It has painted sections which delineate internal areas of 2 x 2, 5 x 10, 10 x 10, and 15 x 10-inch dimmension. Delineation of these sections is made from the inside of the plot frame, with alternate sections of the plot frame painted with alternating colors. Microplot frame type A can be used for sampling of a 20 x 20-inch area (i.e., microplot frame type B) by flipping it over sideways to essentially double its size. The dimensions and color coding conventions of microplot frame type A are illustrated in Figure 7.

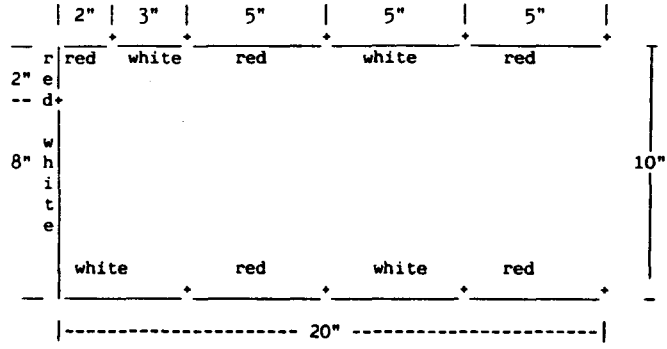

Figure 7. Dimensions and color coding conventions for microplot frame type A.

Microplot frame type B is similar to microplot frame type A, except that it has dimensions of 20 x 20 inches. An illustration of microplot frame type B is provided in Figure 8.

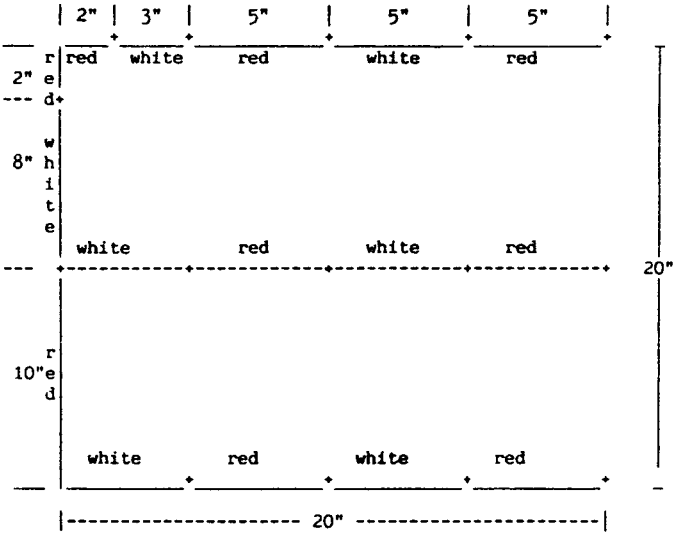

Figure 8. Dimensions and color coding conventions for microplot frame type B.

Microplot Frame Use

Microplots are used to provide estimates of canopy cover and nested rooted frequency by plant species. Subplots within a microplot frame are used to improve such estimates. Examples and dimensions of microplot subplots are provided for microplot frame type A in Figure 9 and Table 6. Microplot frame type B subplots are described in Figure 10 and Table 7.

Subplot #	Dimensions	Area	Percent of microplot
4	2 x 2 in.	4 sq. in.	2
3	10 x 10 in.	100 sq. in.	50
2	10 x 20 in.	200 sq. in.	100

Table 6. Subplot dimensions and areas for microplot frame type A.

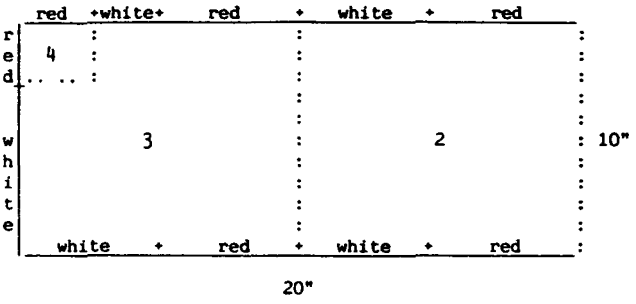

Figure 9. Illustration of subplots for microplot frame type A.

Subplot #	Dimensions	Area	Percent of microplot
4	2 x 2 in.	4 sq. in.	1
3	10 x 10 in.	100 sq. in.	25
2	10 x 20 in.	200 sq. in.	50
1	20 x 20 in.	400 sq. in.	100

Table 7. Subplot dimensions and areas for microplot frame type B.

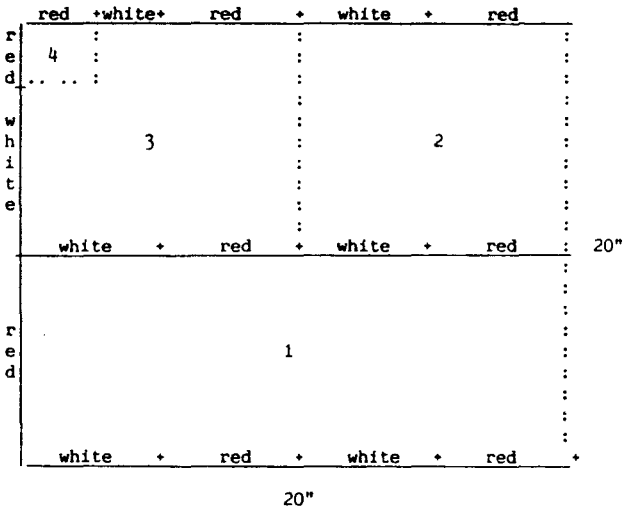

Figure 10. Illustration of subplots for microplot frame type B.

When locating microplots along a transect line, place a pin in the ground at the appropriate foot mark on the transect tape. Position the frame to insure that the outside corner of subplot 4 is to the right of this pin, the base of the plot frame is parallel to the baseline, and subplots 2 and 3 are next to the transect. Microplot frame type A is used for assessments of rooted plant frequency in densely populated plant communities, such as wet meadows. Less dense plant community types are sampled with microplot frame type B. **The same microplot size should always be used when repeating measurements at a macroplot.** Microplot frame type A may be used to mimic microplot frame type B by flipping the frame over to the right to read subplot 1, if a 400 square inch microplot is to be sampled.

For the Cover Microplot Method, a cover class estimate of live foliar canopy cover is made for each plant species in a given microplot. Frequency of occurrence within all the microplots sampled at a macroplot is also recorded by plant species. **For the Nested Microplot Method,** the same types of data are recorded with the addition of nested rooted frequency by plant species. To record nested rooted frequency, find the smallest subplot in which

each species is rooted and enter that number in the appropriate field of the sampling form. A plant species need not be rooted within a microplot to be included in the canopy cover estimate.

Ground cover point samples are recorded along two sides of a microplot frame at the 5, 10, 15, and 20-inch marks. A total of eight points per microplot placement are sampled on the inside section of the frame. Figure 11 illustrates the location of these points on a microplot. Ground cover point locations are the same for both microplot frame type A and microplot frame type B.

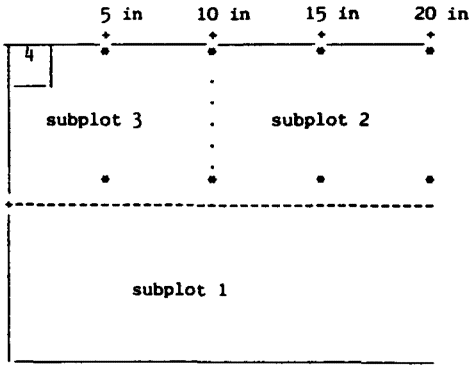

Figure 11. Location of the eight ground cover point samples for microplot frame type A and microplot frame type B.

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APPENDIX H

PHOTOGRAPHS AND PLANT SPECIES SPECIMEN COLLECTIONS

Photographic Record of Plots

Photographic records are desirable for all plots and must be included in the plot record for all permanent sampling plots. Photographs of plots are useful in relocation of permanent benchmarks as well as providing a pictorial record of vegetation change. Points to consider in photographing plots are:

1. The 4 x 5-inch Crowngraphic or Speedgraphic camera is an excellent camera for taking permanent plot photos. Tripod, light meter and ground glass focusing can be used. The focusing cloth is useful. A good quality single lens reflex (SLR) or double lens reflex camera may be substituted for the 4 x 5-inch camera.

2. Permanent plot photo identification is accomplished with a chalkboard or plain paper on which plot identification variables are recorded. Information needed for identification is the Key_ID code for the plot, i.e., Forest, District, Purpose, Year, Examiner and Plot Number. The date (month/day) and project ID or evaluation unit name should also be shown (see Figure 12). If a specific transect or microplot is photographed, identify the transect number or microplot.

Place the chalkboard at the closest position in which it is visible in the photo, i.e., no more than 12 to 15 feet from the camera. Insure that the chalkboard is readable in the photo. It is preferable to prop the identification rather than have someone hold it, since people tend to obstruct both the view and enjoyment of the landscape.

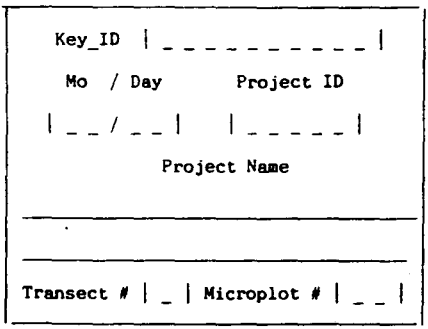

Figure 12. Format example of a photo record.

3. Photographs are taken before plot sampling to insure that vegetation is not trampled. General oblique views of map polygons and general photos within polygons are desirable for walk-through descriptions (i.e., Recon Method). For Fastplot, Ocular Macroplot and nonpermanent Cover Microplot samples, a general view from outside the center of the plot along the slope contour is desirable. For permanent transects, a general photo of the plot area, the baseline, each transect, and the first microplot on each transect is desirable. In special cases it may be desirable to permanently mark the location of the first microplot on the transect with a spike or steel stake.

4. Photographs of a transect or baseline should bisect the transect line with the far end of the line centered in the background. Sufficient surrounding terrain and skyline should be included to aid in relocating the macroplot and transect line. Most of the photo should be of foreground vegetation.

5. Use the smallest lens opening possible consistent with light conditions and shutter speed. This assures maximum depth of field.

6. Other photos may be taken to illustrate conditions of the plot. Plot records will include the following descriptions of photographs:

   a. Point from which photo was taken (camera point).

   b. Height of camera. Camera height should ordinarily be 50 inches measured from ground surface to the camera base.

   c. The transect and microplot numbers associated with the photos. These variables are recorded to insure that plant species and ground cover characteristics can be correlated with photos.

   d. Identification of all people within the photograph.

Plant Species Photographs

Photographs of plant species are very helpful for reference, training in plant identification and correlation with plot data. Photographs should emphasize species habitat, species vegetative and floral characteristics, species phenological changes and effects of various disturbances on species morphology.

A macro lens is desirable for closeup shots of species characteristics. For photos of specific characteristics, the background should be blurred or artificial with emphasis on clarity of the characteristics.

The white-colored plant voucher cardstock (Figure 12) may be used as a background to highlight the plant or to reflect additional light. A flash unit may be needed to photograph plants in shaded understory conditions or on overcast days. In these types of situations, ASA 200 or higher speed film is needed to achieve adequate film exposure. ASA 400 film should be used under denser canopies. This creates a difficulty since high speed film may be too sensitive for good landscape shots on bright, sunny days without shade from an overstory. An ASA of 200 is usually a good compromise for conditions when you are going from an open landscape to shaded understory on sunny days.

Plant Species Voucher Specimens

Personnel involved in ECODATA sampling should collect plant voucher specimens along with plot information. Such specimens are used to verify plant species identification and to aid plant species identification training. Local sources (e.g., universities, Research Stations, etc.) should be consulted for identification of unknown plant species. If local experts in plant identification are not available, send unknown plant species voucher specimens to the Northern Region Ecosystem Management Staff Group for identification.

Use the following procedures in collecting voucher specimens:

1. Prior to going to the field, cut 8.5 x 11-inch sheets from card stock or some other fairly rigid absorbent material.

2. Prior to going to the field, cut 8.5 x 11-inch sheets from clear contact paper.

3. On the back of each 8.5 x 11-inch card stock, stamp, tape or paste the form shown in Figure 13.

PLANT SPECIES VOUCHER SPECIMEN

LIFE FORM CODE __ SPECIES CODE _ _ _ _ _ _

GENUS _

SPECIFIC EPITHET _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

FAMILY _

COMMON NAME _____

LOCATION _____

KEY ID # _ _ _ _ _ _ _ _ _ _

POLYGON ID (GDA, POL#, VT) _ _ _ _ _

OTHER ID CODE _ _ _ _ _ _ _ _ _ _

HABITAT DESCRIPTION _____

_____

Figure 13. Plant species voucher specimen information form.

4. In the field, collect the necessary parts of the plant to identify it both florally and vegetatively. Include root, stem, and flowering organ if possible. Two to three plants are commonly collected to insure successful identification.

5. Arrange previously air-dried plant parts for appropriate visual display on the card stock. Then peel the paper backing from the clear contact paper and cover the card stock with the clear plastic sticky side pressed to the plant and card stock.

6. Complete the form presented in Figure 13 and attatch it to the back of the card stock.

7. Punch holes in the left side of the card stock and place the specimen in a three-ring binder.

8. Attach copies of all completed ECODATA forms for the collection site to the back of the cardstock.

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APPENDIX I

ABBREVIATED LISTING OF CODES FOR ECODATA FIELD FORMS

Contents

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General Plot Data Codes (Fields 1 through 80)	I--2
Plant Species and Optional Sampling Method Data (Field Codes Listed Alphabetically)	I--34

General Plot Data

The following is an abbreviated listing of field codes for Form 3 (General Plot Data). This list may also be used to reference general environmental data codes for Form 1 (Recon Data).

Field 1 - Key_ID (10-character alphanumeric code)

Record in order the codes used to index National Forest (2-digits), Ranger District (1-digit), Purpose (1-character), Year (2-digits), Examiner (1-character) and Plot Number (3-digits).

Forest and District Codes

02	Beaverhead	03	Bitterroot	04	Idaho Panhandle
1	Dillon	1	Stevensville	1	Wallace
2	Wise River	2	Darby	2	Avery
3	Wisdom	3	Sula	3	Fernan
6	Sheridan	4	West Fork	4	St. Maries
7	Madison			6	Sandpoint
				7	Bonners Ferry
				8	Priest Lake
				9	Red Ives
05	Clearwater	08	Custer	09	Deerlodge
1	Pierce	1	Sheyenne	1	Deerlodge
2	Palouse	2	Beartooth	2	Jefferson
3	Canyon	3	Sioux	3	Philipsburg
4	Kelly Creek	4	Ashland-Fort Howes	4	Butte
5	Lochsa	6	Grand River		
6	Powell	7	Medora		
		8	McKenzie		
10	Flathead	11	Gallatin	12	Helena
1	Swan Lake	1	Big Timber	1	Townsend
2	Condon	2	Livingston	3	Helena
4	Spotted Bear	3	Gardiner	4	Lincoln
6	Hungry Horse	6	Bozeman-Gallatin		
7	Glacier View	7	Hebgen Lake		
8	Tally Lake				
14	Kootenai	15	Lewis & Clark	16	Lolo
1	Rexford	1	Rocky Mountain	3	Missoula
2	Yaak	4	Judith	4	Ninemile
3	Fortine	6	Musselshell	5	Plains
4	Troy	7	Kings Hill	6	Seeley Lake
5	Libby			7	Superior
6	Fisher River			8	Thompson Falls
7	Cabinet				

17 Nez Perce
1 Salmon River
3 Slate Creek
4 Clearwater
5 Red River
6 Moose Creek
7 Selway
8 Elk City

18 Glacier NP
1 North Park
2 Middle Fork
3 Hudson Bay
4 Missouri

30 Butte BLM District
1 Hoodoo Resource Area

40 State of Montana Lands
1 Swan State Forest
2 Stillwater State Forest

51 Burlington Northern (Plum Creek) Lands
1 Inside National Forest Boundary
2 Outside National Forest Boundary

52 Champion International Lands

55 Other Private Lands
1 Inside National Forest Boundary
2 Outside National Forest Boundary

Purpose Codes

S	Correlation with stand exam
P	Correlation with permanent timber management plot
T	Correlation with regeneration exam/stake rows
F	Evaluation of fire effects or fire history and fuels
C	Endangered plant species habitat analysis
G	Endangered animal species habitat analysis
W	General wildlife habitat
B	Big game habitat evaluation
R	Range allotment inventory
M	Range monitoring; e.g., readiness, trend, utilization
A	Analysis for recreational impacts--human or stock
V	Correlation with soil survey
D	Watershed erosion, effects, rehab or cover evaluation
K	Mining or oil/gas pad rehabilitation monitoring
Z	Research Plots

L	Correlation/verification for spectral data/landsat
J	RNA and special interset area analysis
E	New Ecosystem classification or succession analysis
I	Integrated multi-resource inventory/monitoring
H	Previous habitat type classification data
X	Other purpose not identified above

Year

Enter the last two numbers of the calendar year. For 1986, enter: 8 6.

Examiner

Enter a number or letter for the examiner or crew, which is unique by District and purpose for the year of sampling.

Plot Number or Sequential Polygon Number

For Recon Data (Form 1), enter a right justified three-digit number for the polygon that is unique by examiner, purpose and year. For General Plot Data (Form 3), enter a right justified three-digit number for the plot that is unique by examiner, purpose and year.

Field 2 - Examiner - Name of Examiner (10-character alphanumeric code) for Form 1, and a 15-character alphanumeric code for Form 3)

Enter the name of the person doing the majority of the species identification, data measurements, and evaluations. If the full name exceeds the alloted space, abbreviate the first name; e.g., U.BUCKWHEAT.

Field 3 - E or Edit - Edit Accuracy (one-character alphanumeric code)

Enter one of the following codes:

- A blank indicates plot data have not been entered into a computer data entry system.

A - Plot data have been entered into a computer data entry system, but the data have not been run through the edit-check program.

E - Plot data have been entered into a computer data entry system, and the data have been run through the edit-check program. Errors have not been corrected.

C - Plot data have been entered into a computer data entry system, and the data have been run through the edit-check program. All severe errors and other real errors have been corrected.

Field 4 - Survey - Survey Type (three-character alphanumeric code)

First character--enter one of the following codes:

A - plot was subjectively located to describe a representative vegetation type within a stand (polygon). Typically used in inventory.

B - plot was subjectively located to be representative of a stand and is used to monitor or describe change in vegetation due to treatment or time. Typically used when monitoring response of vegetation to a vegetation management treatment or when measuring change or trend over time.

C - plot is part of a series of replicated plots which were systematically or randomly located within a stand (polygon) to characterize the stand. Typically used in inventory.

D - plot is part of a series of replicated plots which were systematically or randomly located within a stand (polygon) to characterize a vegetation type within the stand. Typically used in inventory.

E - plot is part of a series of replicated plots which were systematically or randomly located in a treatment or control area to determine change in vegetation due to treatment or time. Typically used when monitoring response of vegetation to a vegetation management treatment or when measuring change or trend over time.

Second character--enter one of the following codes:

- blank indicates accuracy of plot location or permanency of location is not assessed.

P - permanently located plot with stakes and/or measurements to permanent features and a map showing location and plot layout.

L - not a permanently located plot with stakes and/or measurements to permanent features, but accurately located on a 1:24000 or larger scale topographic map or aerial photo to ± 100 feet.

S - not a permanently located plot with stakes or measurements. General plot location is accurate to a stand (polygon) level on a map or aerial photo map base. Examiner is certain based on topographic and vegetation features that the plot occurs in the stand (polygon) it is delineated within.

T - not a permanently located plot with stakes or measurements. General plot location is accurate to the surrounding stands (polygons) on a map or aerial photo map base. Examiner is not certain that the plot occurs in the stand (polygon) delineated, but is fairly sure it is in either that stand (polygon) or one of the adjacent stands (polygons).

G - not a permanently located plot with stakes or measurements. Plot location only known to a general geographic area.

Third character--use this character if the plot is a permanent plot. For a permanent plot, enter the number of years to the next measurement. A blank indicates that the plot is not a permanent plot and is not programmed for remeasurement. A 1 means the plot will be measured annually, a 2 means it will be measured 2 years from now, a 9 means it will be measured 9 years from now. If remeasurement occurs at 10 years, enter a T. For longer intervals enter an A and discuss the interval length in the comments, Field 80.

Field 5 - Mo - Month (two-digit number)

Enter the code for calendar month:

01	January
02	February
03	March
04	April
05	May
06	June
07	July
08	August
09	September
10	October
11	November
12	December

Field 6 - Day (two-digit number)

Enter the calendar day. Use a leading 0 if single digit (i.e., 02).

Field 7 - Project - Project Number or Optional Variable Type (five-character alphanumeric code)

Enter a project code which is unique by Ranger District and purpose or an optional variable code.

Field 8 - PLT - Plot Types (up to three one-character alphanumeric codes for Form 1, and up to 10 one-character alphanumeric codes for Form 3)

Identify the sampling form(s) used to characterize the plot or polygon by entering the following codes:

1 = Recon Data--Form 1
2 = Fastplot Plant Species Data--Form 2
3 = General Plot Data--Form 3 (This form is required when either Forms 2, 4, 5, or 6 are used)
4 = Ocular Plant Species Data--Form 4
5 = Cover Microplot Plant Species Data--Form 5
6 = Nested Microplot Plant Species Data--Form 6
7 = Line Intercept Canopy Cover Data--Form 7
8 = Density Data--Form 8
9 = Production Microplot Plant Species Data--Form 9
A = Short Nested Plot Data--Form A
B = Point Cover Data--Form B
C = Optional Plant Species Attribute Data--Form C

Field 9 - PltRL - Plot Radius or Length (up to a three-digit number)

Enter macroplot radius (for circular plots) or length (for rectangular plots) in feet.

Field 10 - Plot W - Plot Width (up to a three-digit number)

Enter macroplot width in feet if a rectangular plot shape is used. Enter 000 (numeric) if a circular plot shape is used.

Field 11 - Quad - Map Quad Name or Code (12-character alphanumeric code)

For Form 3, enter a unique Forest code or the name of the quad map. For Form 1, enter the above or a photo identifier; etc., as needs dictate.

Field 12 - Satellite - Satellite Photography Spectral Scene (12-character alphanumeric code)

Enter the date (month/day/year) of the scene in the first six characters. Enter a code to denote satellite flight identification in the second six characters.

Field 13 - Aerial Photo - Date and Identification of Aerial Photography Used for Plot or Polygon Location (21-character alphanumeric code)

In the first six characters enter the date (month/day/year) of the aerial photography. In the next 15 characters enter a photo identification number that identifies the flight line and photo along the flight.

Field 14 - Spectral - Spectral Class From Satellite Imagery Analysis (three-character alphanumeric code)

Enter a unique code to denote the spectral class developed from an analysis of one or more bands of satellite imagery spectral data.

Field 15 - PI - Photo Interpretation Type or Optional Variable Type (five-character alphanumeric code)

Enter a unique code to denote the photo type developed from an analysis of aerial photography or an optional variable code.

Field 16 - Legal_ID - Legal Location (10-character alphanumeric code)

Enter the legal location based on Township (3 characters; e.g., 36N), Range (3 characters; e.g., 05W), Section (2 digits; e.g., 05), 1/4 section (1-digit), and 1/4 of 1/4 section (1-digit).

Field 17 - UTM - Universal Transverse Mercator Grid (16-digit number)

Enter up to seven digits corresponding to the N coordinate, then up to seven digits corresponding to the E coordinate and two digits corresponding to the zone.

Field 18 - WL_MUStrata - Wildlife Map Unit Strata (six-character alphanumeric code)

Enter an appropriate wildlife map unit strata code.

Field 19 - Tmbr Strata - Timber Map Unit Strata (six-character alphanumeric code)

Enter an appropriate timber map unit strata code.

Field 20 - TS_ID - Timber Stand Identification (seven-digit stand number, with two, two-digit plot numbers)

Complete the following codes if applicable:

TCO or CO - Compartment (two-digit number)
TSC or SC - Subcompartment (two-digit number)
TStnd or ST - Stand (three-digit number)
PL - Plots (two, two-digit numbers); enter the beginning and ending plot numbers which are being correlated with the macroplot.

Field 21 - Rnge or Range - Range Allotment, Map Unit and Extension (10-character alphanumeric code)

Complete the following codes if applicable:

Allot - Allotment (five-character alphanumeric code)
MU - Map Unit (three-digit number)
EXT - Extension (two-character alphanumeric code)

Field 22 - Ra-Ty - Range Type (Three-character alphanumeric code)

The first character indicates whether the polygon is within a riparian area. A riparian map unit is one that has aquatic or riparian ecosystem type characteristics (Appendix A). Enter one of the following codes to denote map unit riparian status:

1 - a nonriparian map unit is being described
2 - a riparian map unit is being described

The second two characters are the Range Type code from the list below. Range Type is the existing vegetation; i.e., cover type, and not the potential vegetation type. Use the following criteria to evaluate Range Type status at a site:

01 - grassland (uplands and benches with normal seasonal soil moisture regimes; ≥ 10% canopy cover total vegetation; < 10% canopy cover tree saplings and larger; <5% canopy cover mid and tall shrubs (i.e., those > 6" height); graminoid cover ≥ forb cover).
02 - meadow (bottomlands, draws and benches with moisture regimes that are in excess of surrounding uplands such that vegetation continues growth into the hot season; ≥ 10% cover total vegetation; < 10% canopy cover tree saplings and larger; < 5 % canopy cover mid and tall shrubs (i.e., those > 6" height); graminoid cover ≥ forb cover).
03 - perennial forb (≥ 10% canopy cover total vegetation; < 10% canopy cover tree saplings and larger; < 5 % canopy cover mid and tall shrubs (i.e., those > 6" height); forb cover > graminoid cover).
04 - sagebrush (≥ 10% canopy cover total vegetation; < 10% canopy cover tree saplings and larger; ≥ 5% canopy cover mid and tall sagebrush (i.e., those Artemisia species > 6" height)).
05 - browse-mountain shrub (≥ 10% canopy cover total vegetation; < 10% canopy cover tree saplings and larger; ≥ 5% canopy cover mid and tall shrubs (i.e., those > 6" height excluding Artemisia species)).
06 - conifer - with undergrowth forage (≥ 10% canopy cover sapling and larger trees; conifer canopy cover > broadleaf tree canopy cover; > 50 pounds/acre understory forage).
07 - conifer - without undergrowth forage (≥ 10% canopy cover sapling and larger trees; conifer canopy cover > broadleaf tree canopy cover; ≤ 50 pounds/acre understory forage).
08 - rock or barren (< 10% total vegetation cover).
10 - broadleaf trees (≥ 10% canopy cover sapling and larger broadleaf trees; canopy cover of broadleaf trees ≥ conifer trees).
19 - badlands (map units that include a dissected mosaic of grassland and/or shrublands with inclusions of nonvegetated areas and conifer or broadleaf types, where erosion has cut the landscape into an intricate maze of narrow ravines and sharp crests and pinnacles).

Field 23 - Cap Area - Forest Capability Area (six-character alphanumeric code)

Enter the appropriate code from the Forest Plan.

Field 24 - ComPlot - Comparison Plot (10-character alphanumeric code)

Enter the appropriate Key_ID for a plot to be used as a comparison with the plot identified in Field 1 (e.g., control plot, pre-treatment plot, etc.). For remeasurement of permanent plots, enter the Key_ID for the first time the plot was measured.

Field 25 - Rep - Representation (one-digit number)

For Recon Data (Form 1) - enter the code which best describes vegetation type variability within the polygon from the list below.

1 - polygon is a complex, such that two or more vegetation types each make up at least 20 percent of the polygon area. Additionally, there are no inclusions of dissimilar vegetation types.
2 - polygon is a complex with inclusions, such that two or more vegetation types each make up at least 20 percent of the polygon area. Additionally, there are one or more inclusions of dissimilar vegetation types.
3 - polygon has one vegetation type that is 80 percent or more of the polygon. Additionally, there are one or more dissimilar vegetation type inclusions.
4 - polygon has one vegetation type that makes up the total polygon.

For General Plot Data (Form 3) - enter one of the following codes to denote how the plot represents a larger area of surrounding vegetation or a polygon:

1 - plot represents a surrounding vegetation type which is part of a complex in the map polygon, and comprises greater than 20 percent of the polygon area.
2 - plot represents a surrounding vegetation type which is an inclusion in the map polygon, and comprises less than 20 percent of the polygon area.
3 - plot represents a surrounding vegetation type which comprises 80 percent or more of the polygon area, but the polygon has inclusions of dissimilar vegetation types.

4 - plot represents a vegetation type which is the only vegetation type within the polygon. The polygon is not a complex and does not have inclusions of dissimilar vegetation types.

Field 26 - GDA - Geographic Description Area Identification Code (two-character alphanumeric code)

Enter a two-character code that uniquely identifies the area to be mapped.

Field 27 - Po# or Pol# - Polygon Number (two-digit number)

Enter a unique number for the map polygon within the GDA.

Field 28 - VT - Vegetation Type (one-character alphanumeric code)

This code is used to identify vegetation types within a polygon. Enter a 1 for the first vegetation type in the polygon that is described. Enter a 2 if the second vegetation type in the polygon is being described. Use A to denote the 10th plot, B for the 11th plot, etc.

Field 29 - %Po - Vegetation Type Percentage (two-digit number)

Enter the percent area that the vegetation type sampled, as a sum of its discrete units in the polygon, makes up of the total. This will be to the nearest percent, if it is 100 percent enter 99.

Field 30 - Community Size - Size of Community (three-digit number)

Enter an estimated size in acres of the plant community the macro plot or Recon description represents.

Field 31 - Community Shape (two-digit number)

Evaluate the primary shape of the contiguous plant community that the plot or recon description represents. Enter the most appropriate code from the list below.

1 - linear; community is long and narrow; $\geq$ 10 times as long as wide.
2 - rectangular.

3 - greater than 4-sided; e.g., octagon.
4 - oblong or elliptical; community is $\geq$ 4 times as long as wide.
5 - rotund or round; < 4 times as long as wide.
6 - irregular; doesn't fit other descriptions.

Field 32 - ET - Ecosystem Type 2 (one-character alphanumeric code)

Identify the ecosystem type by using the key provided in Appendix A. Enter the appropriate code from the list below.

A = aquatic
B = nonvegetated terrestrial
C = coniferous
D = juniper
E = woodland (deciduous broadleaves)
F = shrub dominated wetland
H = herbaceous dominated wetland
J = shrub dominated alpine
K = forb dominated alpine
L = graminoid dominated alpine
M = shrubland, shrub-steppe, or mountain shrub
N = grassland, grass-steppe or mountain grass

Field 33 - PotTyp1/SCT1 - Potential Natural Community Type or Habitat Type, and Seral Community Type Number 1 (six-character alphanumeric code)

Identify, in the first four characters, the potential vegetation of the plot using the codes provided in Appendix A. Identify, in the fifth and sixth characters, the seral community type of the site.

Field 34 - E2 or Eco Type(2) - Ecosystem Type 2 (one-character alphanumeric code)

If your first determination is questionable, enter the next best determination using the key and codes provided in Appendix A.

Field 35 - PotTyp2/SCT2 - Potential Natural Community Type or Habitat Type, and Seral Community Type Number 2 (six-character alphanumeric code)

If your first determination is questionable, enter the next best determination using the appropriate key and enter the code.

Field 36 - SMU - Soil Survey Map Unit or Landtype Symbol (up to a five-character alphanumeric code)

Enter the appropriate symbol from the soil survey or landtype map of the area.

Field 37 - Soil Taxon (up to a 12-character alphanumeric code)

Enter the appropriate Soil Taxonomic Unit code for the plot.

Field 38 - PM - Parent material (two-digit number)

Enter the appropriate parent material code from the list below.

Basic Rock Type	Code #	Specific Rock Type
SEDIMENTARY		
	1	Limestone (pure & impure)
	2	Dolomite (pure & impure)
	3	Sandstone
	4	Calcareous sandstone
	5	Siltstone
	6	Calcareous siltstone
	7	Shale
	8	Red Shale (colors soils)
	9	Calcareous shale
	10	Conglomerate
	11	Calcareous conglomerate
	19	Sedimentary - type unknown
METAMORPHIC		
	20	Argillite
	21	Calcareous argillite
	22	Siltite
	23	Quartzite
	24	Slate
	25	Phyllite
	26	Schist
	27	Biotite schist
	28	Mica schist
	29	Gneiss and biotite gneiss
	39	Metamorphic - type unknown
IGNEOUS		
	40	Basalt (including obsidian)
	41	Andesite
	42	Diorite to gabbro
	43	Latite
	44	Quartz monzonite

	45	Trachyte & syenite
	46	Rhyolite
	47	Granite & biotite granite
	48	Welded tuff (Tufa)
	49	Scoria (porcellanite), clinker
	59	Igneous - type unknown
MISCELLANEOUS		
	60	Gravelly alluvium
	61	Sandy alluvium
	62	Silty alluvium
	63	Clayey alluvium
	64	Mixed alluvium
	65	Glacial till, mixed origin
	66	Ash (of any origin)
	67	Mixed sedimentary
	68	Mixed metamorphic
	69	Mixed igneous
	70	Loess
	71	Mixed from two or more rock types

Field 39 - Geomorphic Landform (two-digit number)

Enter the appropriate geomorphic landform code from the list below.

Basic Landform	Code #	Geomorphic Landform Type
RESIDUAL MOUNTAIN SLOPES AND RIDGES		
	1	Dissected straight slopes
	2	Dissected convex slopes
	3	Undissected slopes
	4	Ridges
	5	Depressions
	9	Other type
GLACIATED MOUNTAIN SLOPES AND RIDGES		
	10	Undissected slopes
	11	Dissected slopes
	12	Ridges
	19	Other type
ALPINE GLACIAL VALLEYS		
	20	Trough bottoms
	21	Undissected troughwalls
	22	Dissected troughwalls
	23	Avalanche paths and debris fans
	29	Other type

ALPINE GLACIAL RIDGES		
	30	Cirque basins
	31	Cirque headwalls and alpine ridges
	32	Undulating uplands
	39	Other type
ROLLING UPLAND LANDSCAPES		
	40	Low relief rolling uplands
	41	Low relief uplands, dense drainage
	42	Moderate relief rolling uplands
	43	Dissected rolling uplands
	49	Other type
BREAKLANDS		
	50	Dissected river breaks
	51	Undissected river breaks
	52	Structural breaks
	53	Stream headlands
	59	Other type
STRUCTURALLY CONTROLLED MOUNTAIN SLOPES		
	60	Dip slopes
	61	Dipping layered rocks
	62	Plateaus
	69	Other type
GLACIAL TILL FORMS		
	70	Moraines
	71	Drumlins
	72	Kames and kettles
	79	Other type
ALLUVIAL-COLLUVIAL-LACUSTRINE FORMS		
	80	Flood plains
	81	Terraces
	82	Alluvial fans
	83	Colluvial fans
	84	Colluvial basins and toeslopes
	85	Alluvial basins
	89	Other type
MASS WASTED SLOPES		
	90	Landslides
	99	Other type

Field 40 - Pol Pos - Plot Position or Polygon Position (up to four, one-character alphanumeric codes for Form 1; one-character alphanumeric code for Form 3)

Enter the appropriate position code(s) that the vegetation type being described occurs in within the plot or polygon from the list below.

Code	Position
B	Wide valley bottom (> 0.5 miles wide)
S	Slope in a wide valley bottom
R	Ridgetop or rounded knoll in wide valley bottom
F	Flat or plains not in mountainous terrain
V	Narrow valley bottom (100 ft. - 0.5 miles wide)
D	Draw (< 100 ft. wide)
1	Toeslope
2	Footslope
3	Lower slope
M	Mid slope
4	Upper slope
5	Shoulder
6	Bench or terrace in mountainous terrain
7	Narrow ridge
8	Platform summit or broad ridge summit
9	Saddle, gap, or pass on a ridge
G	Short slope, neither upper nor lower

Field 41 - Shp - Slope Shape (up to two, one-character alphanumeric codes for Form 1; one-character alphanumeric code for Form 3)

Enter the appropriate slope shape code(s) that the vegetation type being described occurs in within the plot or polygon from the list below.

Code	Slope Shape
1	Even or straight
2	Convex or rounded
3	Concave or depression
4	Patterned (microrelief of hummock & swale or other)
5	Undulating pattern of low relief ridges or knolls and draws

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Field 42 - Asp - Aspect (two-character alphanumeric code for Form 1; up to a three-digit number for Form 3)

For Recon Data (Form 1), a general aspect class code is entered for the vegetation type being described within the polygon. Use the aspect class codes provided below.

Code	Aspect	Range	Midpoint
F	level or rolling	0	0
N	north	337-22	360
NE	northeast	23-67	45
E	east	68-112	90
SE	southeast	113-157	135
S	south	158-202	180
SW	southwest	203-247	225
W	west	248-292	270
NW	northwest	293-336	315

For General Plot Data (Form 3), aspect is the direction which the plot faces and can range from 1 to 360 degrees. Measure using a compass. Enter the appropriate aspect in degrees. Denote flat areas as 001.

Field 43 - Slp - Slope Percent (one-character alphanumeric code for Form 1; up to a three-digit number for Form 3)

For Recon Data (Form 1), enter the slope class for the vegetation type being described within the polygon. Codes for slope classes are given below.

Code	Class	Midpoint
0 =	0 - 10%	5%
1 =	11 - 20%	15%
2 =	21 - 30%	25%
3 =	31 - 40%	35%
4 =	41 - 50%	45%
5 =	51 - 60%	55%
6 =	61 - 70%	65%
7 =	71 - 80%	75%
8 =	81 - 90%	85%
9 =	> 91%	---

For General Plot Data (Form 3), slope percent of the plot is the average percent slope of the terrain on which the sample plot is located. Be sure to measure slope percent (rise/run x 100) and not

degrees. If the slope is between (or including) 0 and 1.5 percent, enter 001.

Field 44 - Elv - Elevation in feet (three-digit number for Form 1; up to a five-digit number for Form 3)

For Recon Data (Form 1), enter the elevation of the vegetation type being described to the closest 100 feet. For General Plot Data (Form 3), enter the elevation of the plot in feet.

Field 45 - Micro Climate (one-character alphanumeric code)

Enter one of the following codes as appropriate:

1 - cold air drainage or frost pocket
2 - wind blasted environments which maintain vegetation in a deformed state
3 - snow accumulation - late snowmelt areas
4 - upslope warm air flow; area that is in the direct path of afternoon warm air upslope flow from an adjacent deep valley bottom.

Field 46 - SSS - Soil Surface Change or Status (one-character alphanumeric code).

Enter one of the following codes to denote soil surface change of the plot or polygon:

1 soil surface stable and cover adequate to prevent erosion in excess of natural.
2 soil surface is stable; cover is inadequate; trend is toward increased erosion.
3 soil surface is unstable; cover is inadequate; trend is toward increased erosion.
4 soil surface is unstable; cover is inadequate but increasing; trend is toward stability.
5 soil surface is unstable because of compaction (weight per unit volume > natural) causing increased runoff.

Field 47 - ErT - Erosion Type (one-character alphanumeric code)

Enter one of the following codes to denote the type of erosion occurring on the plot.

0 none
1 sheet erosion

2	rill erosion
3	sheet and rill erosion
4	gully erosion
5	sheet and gully erosion
6	gully and rill erosion
7	gully, rill, and sheet erosion
8	deposition
9	wind erosion
A	soil creep
B	slump-earth flow
C	terrace development

Field 48 - Erosion or Deposition Depth (up to a three-digit number)

Enter an estimated average erosion depth for the plot to the nearest 1/10-inch. If erosion depth is between (or including) 0 and 1/10-inch, enter 001.

Field 49 - Percent of Area Eroded or Deposited (up to a two-digit number)

Enter the percent of the plot experiencing erosion or deposition. If it is 100 percent, enter 99. If the value is between (or including) 0 and 1.5 percent, enter 01.

Field 50 - Ground Cover (eight, one-character alphanumeric codes)

Estimate cover class codes at the soil surface level for each of the following ground cover categories.

- S - bare soil (< 1/16-in. diameter soil particles)
- G - gravel (1/16 - 3-in. diameter gravel)
- R - rock (> 3-in. diameter)
- L - litter and duff; litter includes freshly fallen leaves, needles, twigs, bark, and fruits; duff is the fermentation and humus sections of the organic layer.
- W - wood; downed wood that is greater than 1/4-in. diameter.
- M - moss; does not include vascular plants like Lycopodium spp. and Selaginella spp.
- BV - basal vegetation; the soil covered by the basal or root crown portion of plants; this is not the foliar cover of plants; typical values for basal plant cover range between 10 and 20 percent; 30 percent is a very high value and is rarely encountered in the Northern Region.

0 - other; if an additional category (e.g., lichen) is needed use this character and identify the item in the comments (Field 80).

Use the following standard cover class codes in estimating ground cover by categories.

Code	Range of Class	Midpoint
0	0 - 0% cover	0%
T -	>0 - < 1% cover	0.5%
P -	1 - < 5% cover	3.0%
1 -	5 - < 15% cover	10.0%
2 -	15 - < 25% cover	20.0%
3 -	25 - < 35% cover	30.0%
4 -	35 - < 45% cover	40.0%
5 -	45 - < 55% cover	50.0%
6 -	55 - < 65% cover	60.0%
7 -	65 - < 75% cover	70.0%
8 -	75 - < 85% cover	80.0%
9 -	85 - < 95% cover	90.0%
F -	95 - 100% cover	97.5%

Field 51 - SpFe - Special Feature (two-digit number)

Enter one of the following codes to denote the special feature on which the plot is located.

Code	Special Feature
99	not applicable
01	avalanche chute with non-scoured surface (soil not being eroded)
02	avalanche chute with scoured surface (soil eroded, rocks exposed)
03	talus (rock fragments derived from and positioned at the base of a cliff)
04	scree (sheet of stones or rocky debris mantling a slope)
06	sand or gravel bar community within stream or river channel
07	wet meadow (dominated by grasses; soil surface wet in spring and moist in mid-summer)
08	marsh (sedge dominated; soil surface wet in mid-summer)
09	swamp (shrub dominated; soil surface wet in mid-summer)

10	bog mire (mosses on acidic, wet peat soil)
11	fen mire (reeds and sedges on alkaline, wet peat soil)
12	swale (concave or bench area with no surface water, but moist surface soil produces vegetation reflecting moist environment)
13	seep (lower concave or bench area with surface water creating moist surface soil that produces vegetation reflecting moist environment)
14	community that is adjacent to surface water--stream, river, pond or lake (surface water should be within 3 feet vertical and 100 feet horizontal)
15	terrace in valley bottom adjacent to water (> 3 feet vertical and within 100 feet horizontal)
16	snow catchment area (retains snow cover 2-4 weeks longer than surrounding areas of same aspect due to deeper snow accumulation)
17	floating or quaking bog or fen mat

Field 52 - Basal Area (up to a three-digit number)

Enter the basal area in square feet per acre, for all living trees collectively. Determine basal area by multiplying the number of trees counted by the basal area factor. If the basal area is between (or equal to) 0 and 1.5, enter 001.

Field 53 - DBH-Dom - Mean Diameter Breast Height of the Dominant Tree Layer (up to a two-digit number)

Estimate (from several measurements and an ocular evaluation) the average diameter at breast height of the dominant tree layer in inches. If the DBH is between (or equal to) 0 and 1.5, enter 01.

Field 54 - Str or Struc - Structural or Physiognomic Class of the Vegetation Within the Plot or Vegetation Type (one-character alphanumeric code)

Enter the appropriate code from below.

Code	Structural or Physiognomic Class
0	nonvegetated or moss (< 10 percent tree, shrub or herb foliar canopy cover (CC))
1	herbaceous or herbaceous/tree seedling (< 10 percent CC sapling size (i.e, 1.0 - 4.9 in. d.b.h.) and larger trees; < 10 percent CC shrubs)

2	shrub or shrub/tree seedling (> 10 percent CC shrubs; < 10 percent CC sapling and larger trees)
3	sapling (> 10 percent CC sapling trees; ≤ 10 percent CC pole size and larger trees (i.e., 5.0 - 8.9 in. d.b.h.)
4	pole/sapling trees (> 10 percent CC pole size and larger trees; < 10 percent CC trees larger than pole size; about 50-100-year old trees)
5	young-mature trees (> 10 percent CC trees larger than pole size; some trees showing decadence; about 100-200-year old trees)
6	old growth trees (> 10 percent CC trees larger than pole size; past full maturity; showing decadence; 0.5 snag/acre; ≥ 2 canopy levels; overstory canopy closing to 10-40 percent or more; overstory + understory canopy > 70 percent; 3+ in. logs on the ground)
8	krumholtz trees/shrub or herb (trees in a deformed state due to wind, cold and stress)

Use the age/size class criteria presented in Section 4.53 (Field 7) of this document when calculating physiognomic class for broadleaf trees.

Field 55 - VeC - Vegetation Change Indicator (one-character alphanumeric code)

Enter the appropriate code to indicate if the existing community, given present conditions, will change its appearance to that of the potential or climax community for the site.

1	community is stable (will not change significantly in canopy closure, structure or species composition within the next 10 years) and is similar in appearance to the potential or climax community.
2	community is seral and changing toward the potential or climax community (will change significantly in canopy closure, structure or species composition within the next 10 years).
3	community is changing away from the potential or climax community (will change significantly in canopy closure, structure or species composition within the next 10 years).
4	community is seral and stable (will not change significantly in canopy closure, structure or species composition within the next 10 years).

5	cannot determine if the community is stable or changing.

Field 56 - TrC - Total Tree Cover (one-character alphanumeric code)

Estimate the percent canopy cover for trees as a life form. This estimate is not the sum of all tree species and does not count overlap. It is the horizontal percent cover of the vertical projection of trees as a life form. Enter the appropriate percent cover class using one of the following standard cover class codes.

Code	Range of Class
0	0%
T	0.1 < 1%
P	1 < 5%
1	5 < 15%
2	15 < 25%
3	25 < 35%
4	35 < 45%
5	45 < 55%
6	55 < 65%
7	65 < 75%
8	75 < 85%
9	85 < 95%
F	95 - 100%

Field 57 - Pole+ - Canopy Cover for Pole Size and Larger Trees (one-character alphanumeric code)

Estimate the percent canopy cover for pole size (5.0 - 8.9 in. d.b.h.); and larger trees as a group using the standard cover class codes presented in Field 56.

Field 58 - Sapling - Canopy Cover for Sapling Size Trees (one-character alphanumeric code)

Estimate the percent canopy cover for sapling size (1.0 - 4.9 in. d.b.h.) trees as a group using the standard cover class codes presented in Field 56.

Field 59 - Seedling - Canopy Cover for Seedling Size Trees (one-character alphanumeric code)

Estimate the percentage canopy cover of seedling size (<1.0 in. d.b.h.) trees as a group using the standard cover class codes presented in Field 56.

Field 60 - ShC - Total Shrub Cover (one-character alphanumeric code)

Estimate the percent canopy cover for shrubs as a life form. This estimate is not the sum of all shrub species and does not count overlap. It is the horizontal percent cover of the vertical projection of shrub species as a life form. Enter the appropriate percent class using the standard cover class codes presented in Field 56.

Field 61 - Tall Shrub - Canopy Cover of Tall Shrubs (one-character alphanumeric code)

Estimate the percent canopy cover for tall shrubs (those > 4.5 ft. in height) as a group using the standard cover class codes presented in Field 56.

Field 62 - Mid Shrub - Canopy Cover of Medium Shrubs (one-character alphanumeric code)

Estimate the percent canopy cover for medium size (6 in. - 4.5 ft. in height) shrubs as a group using the standard cover class codes presented in Field 56.

Field 63 - Low Shrub - Canopy Cover of Low Shrubs (one-character alphanumeric code)

Estimate the percent canopy cover for low shrubs (< 6 in. in height) as a group using the standard cover class codes presented in Field 56.

Field 64 - GrC - Total Graminoid Cover (one-character alphanumeric code)

Estimate the percent canopy cover for graminoids (grasses, sedges, and rushes) as a life form. This estimate is not the sum of all graminoid species and does not count overlap. It is the horizontal

percent cover of the vertical projection of graminoid species as a life form. Enter the appropriate percent class using the standard cover class codes presented in Field 56.

Field 65 - FrC - Total Forb and Fern Cover (includes Lycopodium spp. and Selaginella spp.) (one-character alphanumeric code)

Estimate the percent canopy cover for forbs and ferns as a life form. This estimate is not the sum of all forb and fern species and does not count overlap. It is the horizontal percent cover of the vertical projection of forbs and ferns as a life form. Enter the appropriate percent class using the standard cover class codes presented in Field 56.

Field 66 - Mean age of Dominant Woody Species (up to a four-digit number)

Determine the average age in years of the dominant layer and enter that value. If the age is between (or including) 0 and 1.5, enter 0001.

Field 67 - Mean Age of Oldest Woody Species (up to a four-digit number)

Determine the average age in years of the oldest trees or shrubs in the stand if they are different from the dominant layer and enter that value. If the age is between (or including) 0 and 1.5, enter 0001.

Field 68 - Dry Weight of Graminoids in pounds per acre (up to a five-digit number)

Enter the dry weight of current year graminoid growth in pounds per acre.

Field 69 - Dry Weight of Forbs/Ferns in pounds per acre (includes Lycopodium spp. and Selaginella spp.) (up to a five-digit number)

Enter the dry weight of current year forb and fern growth in pounds per acre.

Field 70 - Dry Weight of Shrubs in pounds per acre (up to a five-digit number)

Enter the dry weight of shrub leaf and current year leader growth in pounds per acre.

Field 71 - HBC - Herbage and Browse Production Class (one-character alphanumeric code)

Enter one of the following codes to denote total herbage (graminoid + forb + fern) and browse (shrub and understory broadleaf trees) plant species production.

Code	Class Range	Midpoint
1	0 - 50 pounds dry weight/acre	25 lb/acre
2	51 - 500 pounds dry weight/acre	275 lb/acre
3	501 - 1500 pounds dry weight/acre	1000 lb/acre
4	1501 - 2500 pounds dry weight/acre	2000 lb/acre
5	2501+ pounds dry weight/acre	3000 lb/acre

Field 72 - FLC - Fuel Loading Class (two-digit number)

Enter the appropriate code from the following list.

Code	Fuel Loading Class
01	fine, porous and continuous herbaceous fuels of grasslands, savannas, grass-tundra and grass-shrub types.
02	fine herbaceous fuels with some litter and dead stemwood in habitat types with open shrub and forest overstories.
03	tall, thick graminoid dominated stands.
04	forest or shrub stands with a continuous overstory that contain much flammable woody material.
05	forest or shrub stands with light surface fuels and slightly flammable shrub and woody fuels.
06	open forest with shrubs or shrubs that have moderate amounts of flammable woody material.
07	closed forest stands and understory shrub layer with flammable materials in both layers.
08	closed conifer stands with low flammability and a compact litter layer.
09	closed stands of ponderosa pine with a thick litter layer.

10	closed forest types with heavy fuel loading of down woody material.
11	light logging slash, varying in continuity.
12	moderate, continuous logging slash.
13	heavy, continuous logging slash.

Field 73 - NFDRS Fuel Model - National Fire Danger Rating System Fuel Model (one-character alphanumeric code)

Enter the appropriate NFDRS fuel model code from the following list:

Fuel Model	Description
A	western grasslands of annual grasses and forbs
B	mature, dense fields of brush $\geq$ 6 feet tall
C	open pine stands with grass-forb ground fuel
D	pine overstory with palmetto-gallberry understory
E	hardwood and mixed hardwood-conifer after leaf fall
F	mature closed chamise and oakbrush
G	dense conifer with heavy litter and downed wood
H	conifer with sparse undergrowth and thin fuels
I	conifer clearcut with small size slash > 25 TPA
J	conifer clearcut with small size slash < 25 TPA
K	thinning-partial cuts with scattered slash
L	western grasslands with perennial grasses
N	sawgrass prairies of south Florida
O	dense, brushlike fuels of the Southeast
P	long-needled southern pines, closed stands
Q	upland Alaska black spruce
R	hardwoods with green leaves
S	Alaskan or alpine tundra on well-drained soils
T	sagebrush/grass
U	western long-needled pines, closed stand

Field 74 - Duff Depth (two-digit number)

Enter the average depth of the duff layer on the plot to the nearest 1/10-inch. If the depth is between (or equal to) 0 and 0.1 in., enter 01.

Field 75 - Litter Depth (two-digit number)

Determine the average depth of the litter layer on the plot to the nearest 1/10-inch. If the depth is between (or equal to) 0 and 0.1 in., enter 01.

Field 76 - Fuel Depth (two-digit number)

Determine the average depth of ground fuels on the plot to the nearest 1/10-foot. If the depth is between (or equal to) 0 and 0.1 ft., enter 01.

Field 77 - An - Animal Use Evidence (up to two one-character alphanumeric codes for Form 1; up to six one-character alphanumeric codes for Form 3)

Enter the following codes to denote types of animal use on the plot or polygon, in decreasing order of use and effect on the vegetation and site characteristics.

1 = Elk	M = Mountain goat
2 = Deer	P = Porcupine
3 = Moose	G = Pocket gopher
4 = Antelope	H = Horse
5 = Bighorn sheep	S = Ground squirrels
6 = Domestic sheep	B = Bear (species not apparent)
7 = Black bear	R = Rabbit
8 = Grizzly bear	E = Beaver
9 = Cattle	D = Dog

Field 78 - GCD - Ground Cover Disturbance (one-character alphanumeric code)

Enter one of the following codes to indicate ground disturbance.

Code	Disturbance Class
0	undisturbed (ground cover in stable condition)
1	low (if mechanical or animal disturbance, 5-20 percent of ground cover removed exposing bare soil and pavement; if fire, most fine fuels burned, some charring of 3+ in. fuels, woody plants scorched but not burned to the ground; uneven patch burning of duff and litter)
2	moderate (if mechanical or animal disturbance, 20-40 percent of ground cover removed exposing bare soil and pavement; if fire, nearly all fine fuels consumed, some consumption of 3+ in. fuels, some woody plants consumed; patch distribution of duff and litter consumption)

3	high (if mechanical or animal disturbance, 40-100 percent of ground cover removed exposing bare soil and pavement; if fire, many areas of exposed mineral soil, many woody plants consumed, most 3+ in. fuels charred and many consumed; fairly even distribution of duff and litter consumption)

Field 79 - Disturb - Disturbance History (up to three sets of six-character alphanumeric codes for Form 1; up to 10 sets of six-character alphanumeric codes for Form 3)

Enter the following codes to denote disturbance history of the plot or polygon in decreasing order of effect on present vegetation.

Disturbance type is entered as the first two characters; either the intensity or annual frequency of disturbance is entered as the third character; year of disturbance is entered as the fourth and fifth characters; and season of disturbance is entered as the sixth character.

DT = Disturbance Type (two-digit number)

Use the following codes to denote type of disturbance.

99 = Other Disturbance Type, explain in comments (Field 80)

01 = Clear Cut
02 = Shelterwood
03 = Seedtree
04 = Group Selection Cut
05 = Individual Selection Cut
60 = Blow Down
61 = Thinning
62 = Over Story Removal
22 = Other Timber Cut, explain in comments (Field 80)

06 = Broadcast Slash Burn - Planned Ignition
25 = Wildfire in Slash
07 = Jackpot Burn
08 = Dozer Pile and Burn
63 = Understory Burn
09 = Wildfire - natural fuels
10 = Prescribed Burn - Planned Ignition - Natural Fuels
24 = Prescribed Burn - Unplanned Ignition - Natural Fuels
69 = Yum Yarding

21 = Planting
11 = Shade Cards
12 = Herbicide Application
65 = Pesticide Application
66 = Fertilizer Application
67 = Fencing
19 = Grass Seeding
68 = Other Seeding, explain in comments (Field 80)
20 = Poison Baiting
13 = Skid Trail
14 = Heavy Equipment Disturbance

70 = Season Long Grazing System
71 = Deferred Rotation Grazing System
72 = Rest Rotation Grazing System
73 = Deferred Grazing System
74 = Holistic Management Grazing System
15 = Other Cattle Grazing System, explain in comments (Field 80)
16 = Other Domestic Sheep Grazing System, explain in comments (Field 80)

17 = Big Game
18 = Rodents
75 = Other Animal, explain in comments (Field 80)
31 = Spruce Budworm
32 = Mountain Pine Beetle
76 = Other Insect Disease, explain in comments (Field 80)
77 = Blister Rust
78 = Other Disease, explain in comments (Field 80)

40 = Mining Disturbance - Tailing Impoundment
41 = Mining Disturbance - Waste Dump
42 = Mining Disturbance - Open Pit or Cut
43 = Mining Disturbance - Other, explain in comments (Field 80)
50 = Mine Reclamation - Recontouring
51 = Mine Reclamation - Fertilization
52 = Mine Reclamation - Seeding
53 = Mine Reclamation - Topsoil Application
54 = Mine Reclamation - Ground Surface Scarification
55 = Mine Reclamation - Other, explain in comments (Field 80)

I = Intensity or Frequency of Disturbance (one-character alphanumeric code)

Enter one of the following codes to denote either the intensity or frequency of disturbance.

Use the following codes to denote intensity of disturbance.

N = Not Applicable
1 = Low
2 = Moderate
3 = High

Use the following codes to denote the frequency with which a particular grazing use, or other disturbance, occurs within the plot or polygon.

N = Not Applicable
A = Use, or disturbance, occurs every year.
B = Use, or disturbance, occurs once every 2 years.
C = Use, or disturbance, occurs once every 3 years.
D = Use, or disturbance, occurs once every 4 years.
E = Use, or disturbance, occurs once every 5 years.
F = Use, or disturbance, occurs once every 6 to 10 years.
G = Use, or disturbance, occurs once every 11 to 20 years.
H = Use, or disturbance, occurs once every 21 to 50 years.
I = Use, or disturbance, occurs once every 51 to 100 years.
J = Use, or disturbance, occurs once every 101 years or more.

YR = Year of Treatment (two-character alphanumeric code)

If the disturbance occurred during the 1900's, enter the last two characters of the year the disturbance occurred or as close an estimate as can be made. If the disturbance occurred in the 1800's, enter a P for the first character, then enter 1-9 for the nearest 10-year period. For instance, if the event happened in 1888, enter P 9 . For disturbances such as insect and disease, enter the date when evidence was first recorded. For a previous grazing system that has been changed, enter the year the previous system was started. For the present grazing system, enter the year it was started. If you cannot make a reasonable guess for year of disturbance, then enter N A .

S = Season of Disturbance (one-character alphanumeric code)

Use the following codes to denote the season of disturbance.

N = Not Applicable
1 = Winter (plants are dormant due to freezing temperatures; usually occurs from November through March).
2 = Spring (plants are making new growth following winter dormancy; grasses and forbs are in vegetative to flowering stages and are not experiencing stress; conifer buds are open; usually occurs from April through June).

3 = Summer (herbaceous plants are curing out due to moisture and temperature stress; conifer buds harden off; usually occurs from July through August).
4 = Fall (herbaceous plants make some regrowth due to fall rains; forbs, shrubs and broadleaf trees start to turn color and become senescent due to freezing temperatures at night; usually occurs from September through October).
5 = Spring and Summer
6 = Spring and Fall
7 = Summer and Fall
8 = Fall and Winter
9 = Winter and Spring
A = Winter and Summer
B = Winter, Spring, and Summer
C = Spring, Summer, and Fall
D = Summer, Fall, and Winter
E = Fall, Winter, and Spring
F = During Growing Season - defined as active growth prior to dormancy
G = During Dormant Season - defined as period of no growth
Y = Year Long

Field 80 - Comments (up to 60-alphanumeric characters for Form 1; up to 230-alphanumeric characters for Form 3)

Enter comments concerning location, key environmental features, vegetation relationships, history, disturbance factors, etc., not identified in other fields.

Plant Species and Optional Sampling Method Data

The following is a an abbreviated listing of field codes for the plant species data sections of the Basic Sampling Methods and the Optional Sampling Methods. Fields are presented alphabetically to assist reference of specific codes.

ACC - Average Plant Species Foliar Canopy Cover (up to a two-digit number per species per transect)

For each plant species, divide its summed foliar canopy cover within a transect (SUM FCC) by the number of microplots sampled per transect. **This number is rounded off to the nearest percent and entered into the data base.**

AGE/SIZE CLASS - Plant Species Age or Size Class (five one-character alphanumeric codes)

Enter, by plant species, the absolute foliar canopy cover class representative of each of its age or size class expressions. Absolute cover class estimates of dead foliage cover are entered directly for shrubs and herbs. To record dead tree cover, enter all dead trees as separate species. Cover class codes presented for Foliar Canopy Cover are used for all cover entries. Enter the number 0 to denote that a particular age/size class of a plant species is not represented on the plot. The age/size class cover values recorded for a particular plant species may total to greater than 100 percent because of overlap.

The following is a listing of age/size class grouping codes and descriptions arranged by life form:

Life Form	Code	Age/Size Class
Coniferous Trees	1 =	seedlings (< 4.5 ft. tall or < 1.0 in. d.b.h.)
	2 =	saplings (≥ 4.5 ft. tall or 1.0 in. to 4.9 in. d.b.h.)
	3 =	pole (5.0 in. to 8.9 in. d.b.h.)
	4 =	mature (9.0 in. to 13.9 in. d.b.h.)
	5 =	large mature (14.0+ in. d.b.h.)
Broadleaf Trees	1 =	seedlings & sprouts (< 1 year old)
	2 =	small saplings (≥ 1 year and < 6 ft. tall)
	3 =	saplings (≥ 6 ft. tall and <4.9 in. d.b.h.)
	4 =	pole & mature (4.9 in. to 13.9 in. d.b.h.)
	5 =	large mature (14.0+ in. d.b.h.)

Shrubs	1 = seedlings and sprouts (< 1 year old) 2 = young (≥ 1 year and < 10 percent accumulated dead twigs and branches) 3 = mature (≥ 10 percent and < 30 percent accumulated dead twigs and branches) 4 = decadent (≥ 30 percent accumulated dead twigs and branches) 5 = dead
Graminoids & Forbs	1 = seedlings and sprouts (< 1 year old) 2 = young (≥ 1 year without accumulated litter) 3 = mature (accumulated litter present and < 50 percent dead basal veg.) 4 = decadent (≥ 50 percent dead basal veg.) 5 = dead

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C and CC - Foliar Canopy Cover (one-character alphanumeric code)

Enter one of the following codes to denote foliar canopy cover class by plant species.

Code	Class Range	Midpoint
T	0.1< 1%	0.5%
P	1 < 5%	3.0%
1	5 < 15%	10.0%
2	15 < 25%	20.0%
3	25 < 35%	30.0%
4	35 < 45%	40.0%
5	45 < 55%	50.0%
6	55 < 65%	60.0%
7	65 < 75%	70.0%
8	75 < 85%	80.0%
9	85 < 95%	90.0%
F	95- 100%	97.5%

Cover Data by Transect (up to a three-digit number per species per transect)

Enter the sum of live canopy cover, in inches, intercepted above and below the transect line by plant species. Gaps within the live foliar canopy of a species are not included in cover assessments. Totals of intercept are recorded by plant species and belt transect for data processing. The total recorded cannot exceed the length of the transect and does not count overlap of the same species.

DENSITY DATA BY TRANSECT - Transect or Circular Microplot Item Counts (up to a three-digit number per item per transect or microplot)

Enter the total number of each item within each transect or microplot. Additional space is provided on the form to record box tallies of item occurrences within a transect or microplot.

DI - Distribution Class (one-digit number)

Look at the distribution of the plant species individuals in the plot. Select one of the following codes to denote a particular species distribution within the plot.

0 Distribution class not recorded.
1 Individuals are randomly distributed or dispersed.
2 Individuals have a clumped distribution.
3 Individuals have a regular distribution.
4 Individuals are grouped into colonies that are randomly or regularly distributed.
5 Not enough individuals to determine their pattern of distribution.

DW - Microplot Dry Weight Production by Item (up to a four-digit number per item per microplot)

Enter the total measured dry weight production (in grams) of a given item by microplot. Dry weight is obtained by multiplying the item's microplot green weight (GW) by an appropriate dry weight factor (DWF).

DWF - Dry Weight Factor (two-digit number per life form per transect)

Enter an appropriate dry weight factor to convert summed microplot green weight estimates of a life form along a transect (SUM GW) to total dry weight. Dry weight factors are provided by life form in Section 4.42 after Field 67.

F - Nested Rooted Frequency (one-digit number per species per microplot)

Nested rooted frequency is recorded, by plant species, in each microplot using the following procedure:

Record the smallest size subplot each plant species of the microplot is rooted in. Start with subplot 4. If the basal portion of a plant species is rooted in that subplot, record a 4 for the species. Go to subplot 3 and record a 3 for all plant species rooted in that subplot which were not previously recorded in subplot 4. Continue this same procedure for subplot 2, if microplot frame type A is being used, and for subplots 2 and 1 if microplot frame type B is used (Appendix G).

GW - Microplot Green Weight Estimates of Above Ground Biomass by Item (up to a four-digit number per item per microplot)

For each microplot use a bag, gram scale and clippers to weigh units of green foliage by item. Estimate the grams green weight, by item, for the whole microplot. All foliage that hangs over the microplot is included in such estimates. Shrub foliage above 7-foot height is not included in production estimates.

I - Largest Age, Size Class, Height, or Other Indicator Value (one-character alphanumeric code)

For each tree species, enter one of the following codes to denote the largest living size class which constitutes 10 percent or more relative cover for the species.

Life Form	Code	Age/Size Class
Coniferous Trees	1	= seedlings (< 4.5 ft. tall or < 1.0 in. d.b.h.)
	2	= saplings (≥ 4.5 ft. tall or 1.0 in. to 4.9 in. d.b.h.)
	3	= pole (5.0 in. to 8.9 in. d.b.h.)
	4	= mature (9.0 in. to 13.9 in. d.b.h.)
	5	= large mature (14.0+ in. d.b.h.)
Broadleaf Trees	1	= seedlings & sprouts (< 1 year old)
	2	= small saplings (≥ 1 year and < 6 ft. tall)
	3	= saplings (≥ 6 ft. tall and <4.9 in. d.b.h.)
	4	= pole & mature (4.9 in. to 13.9 in. d.b.h.)
	5	= large mature (14.0+ in. d.b.h.)

For each shrub and herbaceous species, enter the average height of the upper layer of the species to the nearest foot. For species less than 6 inches, enter 0 . For species greater than 9.5 feet, enter T. If indicator values different than those presented are entered, keep a record of the codes used in the appropriate project file.

IN - Indicator Class (one-character alphanumeric code)

This code is used to indicate special characteristics of different plant species. Codes utilized are specific to a given study and should be noted in the appropriate project file. If indicator class if not recorded, enter the number 0.

ITEM NAME/AGE - Name of Item and its Age or Size Class Code (six-character alphanumeric code to denote the items name followed by a one-digit number to denote its age or size class)

ITEM NAME

If a plant species is being recorded, enter the first three letters of the genus and the first three letters of the specific epithet in capital letters. Dead trees are entered as separate species from their living counterparts. To denote a dead tree species, use the code DEAD followed by the appropriate two-letter species identifier from Appendix B.

If an item besides a plant species is sampled, enter a unique six-digit capitalized alphanumeric code from the special code section of Appendix B. Coordinate with the Regional Office for development of additional item codes. The following codes are from Appendix B:

Code	Item	Code	Item
GOPMOU	Gopher Mound	COWPIE	Cattle dropping
GOPCAS	Gopher Cast	SHEPIE	Domestic sheep
BEAPIE	Bear dropping	ELKPIE	Elk dropping
DEEPIE	Deer dropping	MOOPIE	Moose dropping

AGE - Age or Size Class Codes

The following codes may be used to denote the age or size class of an item in density sampling. An age or size class code is entered after the six-character name of an item.

Life Form	Code	Age/Size Class
Coniferous Trees	1 =	seedlings (< 4.5 ft. tall or < 1.0 in. d.b.h.)
	2 =	saplings (≥ 4.5 ft. tall or 1.0 in. to 4.9 in. d.b.h.)
	3 =	pole (5.0 in. to 8.9 in. d.b.h.)
	4 =	mature (9.0 in. to 13.9 in. d.b.h.)
	5 =	large mature (14.0+ in. d.b.h.)
Broadleaf Trees	1 =	seedlings & sprouts (< 1 year old)
	2 =	small saplings (≥ 1 year and < 6 ft. tall)
	3 =	saplings (≥ 6 ft. tall and <4.9 in. d.b.h.)
	4 =	pole & mature (4.9 in. to 13.9 in. d.b.h.)
	5 =	large mature (14.0+ in. d.b.h.)
Shrubs	1 =	seedlings and sprouts (< 1 year old)
	2 =	young (≥ 1 year and < 10 percent accumulated dead twigs and branches)
	3 =	mature (≥ 10 percent and < 30 percent accumulated dead twigs and branches)
	4 =	decadent (≥ 30 percent accumulated dead twigs and branches)
	5 =	dead
Graminoids & Forbs	1 =	seedlings and sprouts (< 1 year old)
	2 =	young (≥ 1 year without accumulated litter)
	3 =	mature (accumulated litter present and < 50 percent dead basal veg.)
	4 =	decadent (≥ 50 percent dead basal veg.)
	5 =	dead

Other classes may be substituted for age or size class, such as categories for structure and hardness of snags or downed logs. Such classes will be specific to a given study and should be recorded in the appropriate project file.

ITEM - Point Cover Data Method - Name of Item (six-character alphanumeric code)

If sampling by plant species is performed, enter the first three letters of the genus and the first three letters of the specific epithet in capital letters. Identify plants to species, if possible. Check in Appendix B for symbol notations to be used for plant species with duplicate six-letter codes. If identification is only made to genus, enter the first six letters of the genus. If the genus name is less than six letters, use an "X" for the

missing letters. If sampling by life form is performed, enter the appropriate life form code from Appendix B.

If an item besides a plant species is sampled, enter a six character code for the item from the special code section of Appendix B.

ITEM - Production Data Method - Plant Species, Genus, or Life Form Name (six-character alphanumeric code)

If sampling by plant species is performed, enter the first three letters of the genus and the first three letters of the specific epithet in capital letters. Identify plants to species, if possible. Check in Appendix B for symbol notations to be used for plant species with duplicate six-letter codes. If identification is only made to genus, enter the first six letters of the genus. If the genus name is less than six letters, use an "X" for the missing letters. If sampling by life form is performed, enter the appropriate life form code from Appendix B.

KEY_ID (10-character alphanumeric code)

Enter the Key_ID identified in Field 1 of Forms 1 or 3 (Recon Data or General Plot Data).

L and LF - Life Form (one-digit number)

For each species, enter its appropriate life form code from the list below.

Code	Life Form
1	tree (includes conifer and broadleaf trees)
2	shrub (includes woody stemmed vines & subshrubs)
3	graminoid
4	forb
5	fern/allies (includes Lycopodium and Selalginella)

MHT - Mean Height (up to a three-digit number)

Estimate, by plant species, average upper layer height to the nearest foot. The following coding convention is used to denote average plant species height. For plant species less than 6 inches in height, enter a 0. For plant species between 6 and 18 inches in height, enter a 1, for 18 to 30 inches, enter a 2, etc.

Mean height of a plant species on a macroplot is entered only once in the data base. Consequently, it should be recorded on the first transect form that a species appears on.

N - Number of Microplots the Plant Species Occurred In (one-character alphanumeric code per species per transect)

Count the number of microplots, by transect, the plant species was present in (i.e., its frequency). For one through nine occurrences, enter 1 through 9. For 10 occurrences, enter F.

NAME - Plant Species Name (six-character alphanumeric code)

Enter the first three letters of the genus and the first three letters of the specific epithet in capital letters. Identify plants to species, if possible. Check in Appendix B for symbol notations to be used for plant species with duplicate six-letter codes. If identification can only be made to genus, enter the first six letters of the genus. If the genus name is less than six letters, use an "X" for the missing letters. If identification can only be made to life form, enter the appropriate life form code from Appendix B. Dead trees are entered as separate species from their living counterparts. To denote a dead tree species, use the code DEAD followed by the appropriate two-letter species identifier from Appendix B.

No of Items - Number of Items (up to a two-digit number)

Enter the number of different items sampled.

No of Microplots - Number of Microplots (up to a two-digit number)

Enter the number of microplots sampled per transect. Five microplots are usually recorded per transect in this method; however, up to 10 microplots may be sampled per transect dependent on study needs.

No of Transects - Number of Transects (one-digit number)

Enter the number of transects being recorded. This number will usually be five, but cannot exceed seven.

No_Sp and No of Plant Species - Number of Plant Species (up to a two-digit number)

Enter the number of plant species recorded on the form.

No Species - Number of Plant Species (up to a two-digit number)

Enter the total number of plant species recorded within the microplots used to sample the macroplot.

Number of species allowed - Only 45 species may be entered into the data base. If more than 45 species are encountered, delete those with low combinations of cover and frequency until 45 remain.

Number of Plots (up to a two-digit number)

Enter the number of production microplots sampled. **A maximum of 20 microplots may be sampled within a plot.**

PH - Phenology Class (one-digit number)

Record the average phenology of the plant species using the following codes:

0 Phenology class not recorded

Coniferous trees

1 pre-bud break
2 post-bud break
3 cones developed

Shrubs and Broadleaf Trees

1 less than 3/4 leaf development without flowers
2 3/4 to full leaf without flowers
3 flowering with leaves developed
4 seeds developed with leaves developed
5 fruits developed with leaves developed
6 senescent leaves
7 flowers developed prior to 3/4 leaf development
8 no floral development this year, full vegetative growth

Forbs

1 less than 3/4 leaf development without flowers
2 3/4 to full leaf without flowers
3 flowering with leaves developed
4 seeds developed with leaves developed
6 senescent leaves
8 no floral development this year, full vegetative growth

Graminoids

1 leaves partially developed, no heads
2 inflorescence inside the sheath (in the boot)
3 inflorescence partially exerted from the sheath
4 inflorescence fully exerted from the sheath
5 seed heads dispersed
6 senescent leaves
8 no seed head this year, full vegetative growth

Plot Size - Cover Microplot and Nested Microplot Methods (one-digit number)

Enter one of the following codes to denote the microplot size being used:

1 = Microplot frame type A (10 in. x 20 in.).
2 = Microplot frame type B (20 in. x 20 in.).

Plot Size - Production Data Method (up to a three-digit number)

Enter the production microplot size used in square feet, to the nearest 0.1-square foot. Only one microplot size may be used to sample a given plot. Production microplots may be either rectangular or circular in shape dependent on study needs.

Plots/Transect - Number of Microplots Sampled per Transect (up to a two-digit number)

If the sampling design used required placement of production microplots along established transects within the plot, enter the number of microplots sampled per transect. The number of microplots sampled is the same for all transects.

POINT COVER DATA BY TRANSECT - Number of Item Counts by Transect (up to a three-digit number per item per transect)

Enter the total number of point cover "hits" for each item by transect. Additional space is provided on the form to record box tallies of item point cover "hits" within a transect.

PT - TS - Transect Shape Code (one-digit number per item)

Enter "1" if a rectangular shaped transect is used to sample a given item and "2" if a circular microplot is used.

SF - Shrub Form Class (one-digit number)

For shrub species, select one of the following codes:

0 Shrub form class not recorded

1 Little or no hedging, indicating light use in the past 3 or 4 years. Growth tends to be linear.

2 Moderately hedged. Use within the past 3 or 4 years has created much development of lateral branching and a more complex growth.

3 Heavily or closely hedged. Heavy use in the past 3 or 4 years has created a pronounced "broomed" or "clubbed" appearance.

Species - Plant Species Name (six-character alphanumeric code)

Enter the first three letters of the genus and the first three letters of the specific epithet in capital letters. Identify plants to species, if possible. Check in Appendix B for symbol notations to be used for plant species with duplicate six-letter codes. If identification can only be made to genus, enter the first six letters of the genus. If the genus name is less than six letters, use an "X" for the missing letters. If identification can only be made to life form, enter the appropriate life form code from Appendix B. Dead trees are entered as separate species from their living counterparts. To denote a dead tree species, use the code DEAD followed by the appropriate two-letter species identifier in Appendix B.

SRF - Sum of Nested Rooted Frequency (up to a two-digit number per plant species per transect)

Enter the sum of nested rooted frequency values, within a transect, by plant species. This value is calculated by adding the subplot numbers recorded for a given plant species over all microplots sampled within a transect.

SUM FCC - Plant Species Summed Foliar Canopy Cover (up to a three-digit number per species per transect)

Use this space to calculate a given plant species summed foliar canopy cover by transect. This is accomplished by adding the mid-point foliar canopy cover class values recorded over the microplots sampled. This value is not entered in the data base.

SUM GW - Summed Green Weight Estimates by Life Form (up to a four-digit number per life form per transect)

Enter the total grams of green weight recorded within the microplots by life form and transect. These data are not entered into the data base for analysis. They are used to compute total dry weights (Total DW).

SUM - Microplot Ground Cover (up to a two-digit number per category per transect)

Sum the total number of ground cover points sampled along a transect by ground cover category. Each microplot used in the summary will have a total of eight points.

TNP/T - Total Number of Points per Transect (up to a three-digit number)

Enter the total number of points sampled along a transect. This value is the same for all transects within a plot.

TOTAL DW - Total Dry Weight Production by Life Form Class (up to a four-digit number per life form per transect)

Enter the total measured dry weight production (in grams) of a given life form by transect. Dry weight is obtained by multiplying the life form's summed microplot green weight (SUM GW) by an appropriate dry weight factor (DWF).

Transect Length - Density Method (up to a three-digit number)

Enter transect length, in feet, if a rectangular transect shape is sampled within the plot. Only one transect length is used at a given plot. Width of the transect may be adjusted to facilitate improved density sampling of different items at a plot. If only microplots of circular shape are sampled within the plot, enter "000".

Transect Length - Line Intercept Method (up to a three-digit number)

Enter the transect length in feet. A 66-foot transect is usually used to sample a 1/10-acre rectangular macroplot.

Transect Number (one-digit number)

Enter a number between one and seven to denote the belt transect being recorded. Transects are numbered from left to right along the baseline. This value is not entered into the data base, since data entry is structured by transect number.

UT - Utilization Class (one-character alphanumeric code)

Estimate percent utilization based on the volume of current year's growth removed by herbivores. For those species which display utilization, enter one of the following class codes to denote the percent utilization present. If utilization class is not recorded, enter the number 0.

Code	Class Range	Midpoint
T	0.1< 1%	0.5%
P	1 < 5%	3.0%
1	5 < 15%	10.0%
2	15 < 25%	20.0%
3	25 < 35%	30.0%
4	35 < 45%	40.0%
5	45 < 55%	50.0%
6	55 < 65%	60.0%
7	65 < 75%	70.0%
8	75 < 85%	80.0%
9	85 < 95%	90.0%
F	95- 100%	97.5%

WIDTH - Transect Width or Circular Microplot Radius (up to a three-digit number)

Enter transect width, in inches, if sampling a rectangular shaped transect. Enter microplot radius, in inches, if sampling a circular microplot.

ECOSYSTEM CLASSIFICATION HANDBOOK

APPENDIX J

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ECOSYSTEM CLASSIFICATION HANDBOOK

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